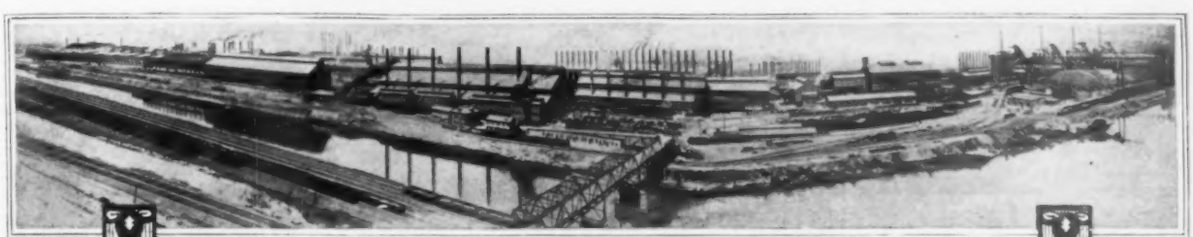
FEB 2 1918
UNIV. OF MICH.

THE IRON AGE

New York, January 31, 1918



RHOADS LEATHER BELTING

SATISFACTORY SERVICE

AS the tortoise proved to the hare, it pays to keep your machinery going; so think the managers of the large mill shown above when they buy Rhoads Belts.

"It was the best belt we have ever had for this drive," said the superintendent of a steel castings company when replacing an 8-inch Rhoads double which has been driving a grinder for nearly three years.

The average life of belts previously used was eight to twelve months. Naturally he ordered another Rhoads Belt

A 24-inch double in a radiator plant carries a load of 115 H. P. which goes up to 160 H. P. every 15 seconds. This jerk has caused no apparent slip, and the engineer says "It is the truest running belt I ever saw."

Such satisfactory service is prolonged if the belts are treated at proper times with Rhoads Leather Belt Preserver. This is a special preparation for preserving the grip, pliability, toughness and life of leather belts.

J. E. RHOADS & SONS

PHILADELPHIA 36 N. Third Street | NEW YORK 126 Beekman Street | CHICAGO 346 W. Randolph Street | BALTIMORE AGENCY 36 S. Charles Street

Factory and Tannery, Wilmington, Delaware

TABLE OF CONTENTS - - - 337

Buyers' Index Section.....341
Wanted Section 317
Contract Work Section.....327
Help and Situations Wanted.....322
Business Opportunities 319

ADVERTISING INDEX - - - 359

Clearing House Section.....273
Professional Notices 326

NATION WIDE STEEL-SERVICE

CHICAGO NEW YORK ST. LOUIS DETROIT

DETROIT PLANT

IRON AND STEEL REQUIREMENTS FROM FOUR LARGE STEEL-SERVICE PLANTS

JOSEPH T. RYERSON & SON

IRON STEEL MACHINERY

THE IRON AGE

New York, January 31, 1918

ESTABLISHED 1855 VOL. 101: No. 5

The Old-Time Iron Treasure Chest

An Interesting One Recently Discovered in Philadelphia — Research Throws Light on Contemporary Methods of Iron Manufacture

BY ALEXANDER E. OUTERBRIDGE, JR.

IN ancient times, before the days of banks and safe-deposit vaults, the care of valuables, such as specie, gold and silver plate, jewels, deeds, wills and precious articles of various kinds, caused much anxiety at times to their owners from the fear of robbers and danger of fires.

When persons of wealth started upon long journeys in olden days, either by land or sea, the care of their gold and silver money and other valuables was indeed a serious matter; the anxieties of travel were greatly enhanced by the difficulty of insuring safe transportation of such treasures.

This caused a great demand for the making of "strong boxes," as they were called, the predecessors of our modern burglar and fireproof safes. These boxes, also called "treasure chests" (French "coffres") resembled small-sized trunks in shape. They were sometimes made of heavy plates of wrought iron, welded together and reinforced with many broad bands of iron, crossing and recrossing, securely fastened with scores of round-knobbed rivets; they had strong, twisted iron handles and two men were needed to lift one of these boxes even when empty, and when filled with coins, jewels and silverware, four strong men were needed to handle them.

The Old Treasure Chest Recently Found in Philadelphia

Great ingenuity was displayed in the design and construction of the locks, which were massive and complicated. The huge keys were forged by hand from wrought iron and often weighed 30 or 40 times more than a modern Yale lock key. Highly skilled artisans, or workers in metals, produced these hand-wrought treasure chests, and even though such labor in those days was comparatively cheap the cost of these boxes was considerable.

Very recently, while strolling through an out-of-the-way and rather unattractive section of Philadelphia, along a street lined with dingy shops displaying cast-off garments, half-worn shoes and old furniture for sale, the writer's attention was attracted by noticing on the sidewalk an unmistakably genuine treasure chest such as we have just described. The strong box was very rusty and bore evidence of having been buried for a long time in the ground. The proprietor of the little second-hand furniture shop proved to be an intelligent young man, a motorman doing night work and adding to his income by buying up old furniture, which his wife sells. The story he told regarding the box was quite interesting and will be given in his own words as nearly as may be possible. He said:

I heard the other day that a very old lady living in the northwestern part of this city was breaking up housekeeping and was selling all of her possessions. When I went to the house the old lady was seated beside this iron chest, busily engaged in tearing up letters and papers with which the box had apparently been filled. She had destroyed all save one old newspaper in the bottom of the chest, which I fortunately secured. She told me she was the last of her tribe and meant to leave nothing behind her, and that she knew that the box had been in their possession for much more than a century. I bought the box and brought it here not half an hour ago. The old newspaper, dated

B. Franklin

L'ART
DE
CONVERTIR LE FER
FORGE
EN ACIER,
ET
L'ART
D'ADOUCIR LE FER FONDU,
Ou de faire des Ouvrages de fer fondu auſſi finis que de fer forgé.

Par Monſieur de REAUMUR,
de l'Academie Royale des Sciences.

A PARIS,
Chez MICHEL BRUNET, Grand'Salle du Palais, au Mercure Galant.

M. DCC. XXII.
AVEC APPROBATION ET PRIVILEGE DU ROY.

The Title Page of An Old Book on Converting Iron into Steel and on the Art of Making Cast Iron. It has the autograph of "B. Franklin"

and it is in a perfect state of preservation. It is covered with a perforated metal plate, apparently coated originally with silver, and having engraved upon it two winged dragons with forked tails, possibly armorial bearings. Notwithstanding the fact that the exterior of the chest is badly rusted the interior is quite free from corrosion.

Since its discovery and purchase by the writer this old iron chest has been critically examined by scores of mechanics, skilled workers in iron and steel, and one and all unite in praise of the skill shown in its manufacture, entirely by hand work, as well as of the ingenuity displayed in the design and construction of the great lock and key. Counting two padlocks, there were actually three different locks and nine separate fastenings on the chest. It is truly remarkable that after certainly more than a century, and probably more than two centuries, of use and exposure, the lock should be in as perfect condition to-day as when first made. This speaks volumes for the care and skill of the artisans who fashioned it so long, long ago.

Eventually the old strongbox may find a resting place in a museum, but in the meantime it will serve as a woodbox for the open fireplace in the writer's library.

Several inquiries have come to the writer since he prepared a brief ac-

July 10, 1805, is still in the box, and I suppose you might like to see the inside of the chest.

The young man then produced a massive iron key and suggested to the writer that he try to discover how to unlock the chest. There is an ornamental "escutcheon" on the front, with a large keyhole in the center, into which he inserted the key, but it soon became evident that this was merely a sham intended to deceive any thief who might have surreptitiously obtained possession of the key. There was no connection with the lock here.

After careful examination it was noticed that a slot had been cut in one of the bands on the top of the chest 3 in. long by 1 in. wide, and a piece of iron was carefully mitered or fitted into the opening. There was a large round rivet in the middle of the inserted piece, and a little notch was cut on the underside of the rivet; by inserting the fingernail in this notch and pulling gently, the piece sprang up, having been held down by a spring, and it could then be swung around revealing the true keyhole. On inserting the key, and giving it a half turn, five bolts, which are operated independently of each other by strong springs, shot back, permitting the lid to be raised.

The lock is an elaborate piece of mechanism, occupying the entire underneath side of the top of the chest,

422 BOOK IX.

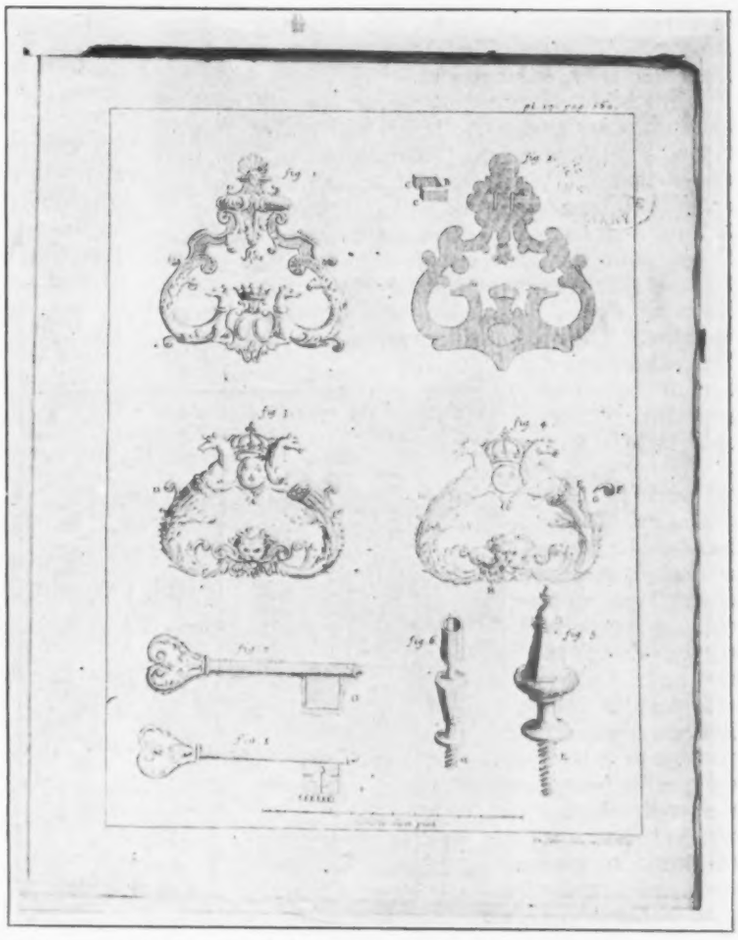
A—Hearth. B—Bellows. C—Slag-vent. D—Iron mass. E—Wooden mallets. F—Hammers. G—Anvil.

One of the Illustrations from Agricola's Great Work as Translated by Herbert C. Hoover and His Wife

count of the discovery of this "coffer" for a Philadelphia newspaper, asking further particulars, and the editor of THE IRON AGE has requested more details, "indicating how it was made, the character of the material," etc.

The answer to these questions required considerable antiquarian research, which, for a time, seemed almost like searching for a needle in a haystack, but it has, nevertheless, proved successful in finding some interesting data relating to the state of the art of iron manufacture and metalworking in general, and the production by handcraft of treasure chests in particular at or near the time it is thought that this coffer was made.

Searching in several public and private libraries, the writer fortunately found a number of rare and valuable old books on arts and sciences on the shelves of the Franklin Institute, Philadelphia, which are probably but little known to the engineering profession or to the public at large. One of these books, having the autograph "B. Franklin," in his familiar handwriting, is considered so precious, partly on this account, that it is always kept locked in a fireproof safe. A photographic reproduction of the title page is presented in one of the illustrations, as well as one of the copper plates illustrative of the manner of making keys, similar to the one belonging to the old chest.



A Copper Plate from an Ancient Book which Shows the Various Parts of an Old Chest, Similar to the One Just Discovered

Another Illustration from Agricola's Famous Book as Translated by Mr. and Mrs. Herbert C. Hoover

It may probably surprise the readers of this article, as it certainly did the writer, to learn that a magnificent folio volume, a translation of the first Latin edition, 1556, of

DE RE METALLICO by GEORGIUS AGRICOLA

containing hundreds of footnotes and cross references, revealing a vast amount of scholarly research, was published in London in 1912, by Herbert C. Hoover and Lou H. Hoover. Since that time Mr. Hoover has attained world-wide celebrity for his philanthropic work in Belgium and in this country, exhibiting a genius for organization that is not usually looked for in a classical scholar.

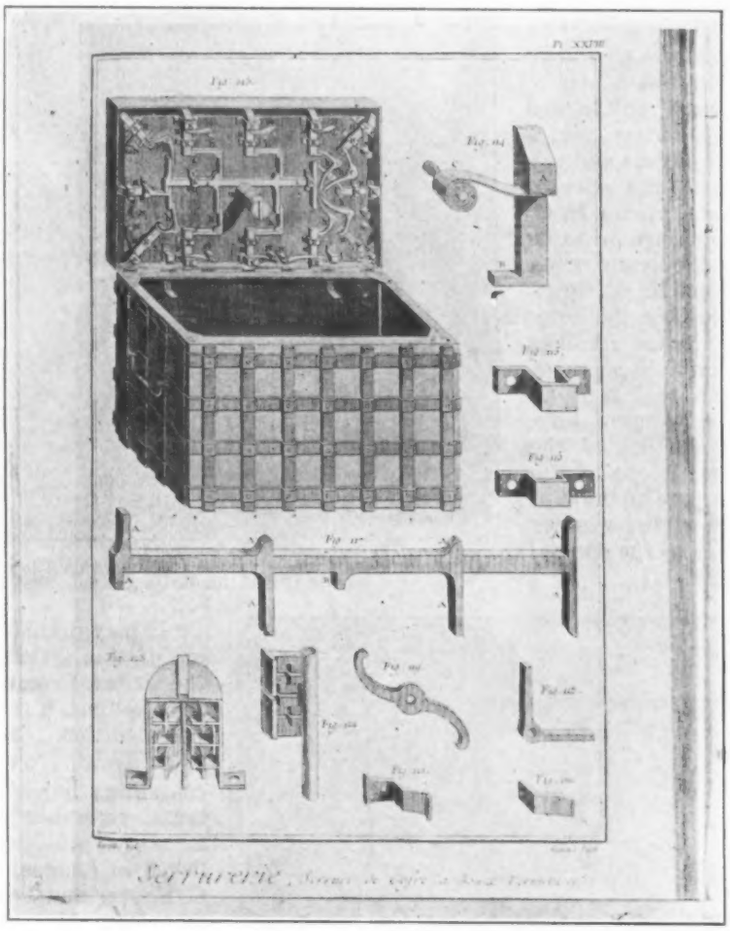
Two other illustrations are photographic reproductions of two of the original illustrations from Agricola's great work. Another monumental work consulted, from which the last illustration was taken, is an Encyclopædia of Arts and Sciences, in 34 large volumes, in the French language, the first volume bearing the date 1751.

Twenty-two of these volumes are text and 17 are splendid copper-plate engravings. The lack of an index, however, necessitated searching through all of these volumes, but the writer was finally rewarded by finding a chapter on "Coffres" or iron treasure chests, and several plates showing not only the construction of a coffer, with its elaborate lock, occupying the whole of the underneath side of the lid, and

of various details, but also plates showing padlocks and a great variety of keys, handles and escutcheons made for these strongboxes.

Still other illustrations show the old methods of laminating iron bars, bands and plates, forging rivets, angle irons, etc. The elaborate title page states that this encyclopædia of the arts and sciences has been prepared by a coterie of men of letters, and has been arranged in order and published with the approbation and privilege of the king by M. Diderot of the Royal Academy of Sciences of Paris, and a long list of other learned societies. The mathematical portion is by D. Alembert, also a member of numerous societies. The date is MDCCLI.

The monumental work of Georgius Agricola was translated into several languages years ago, but nothing approaching the completeness and doubtless accuracy of the Hoovers' superb production has heretofore appeared. A copy of the title page will serve to give the reader some idea of the scope of the original work and of the labor of love of the erudite translators, but of course this does not show the really splendid book work, typography, paper and binding of this edition de luxe, which should be found in every important library.



Details of Locksmithing Lock of Ancient Coffer Having Twelve Bolts. Fig. 113, strong coffer with lock; Fig. 114, one of the bolts. A-A, chamfered head; B, the heel; C, spring on roller. Figs. 115-116, hold-fasts on bolt nabs of lock; Fig. 117, large bolt A-A; the barb, B; Fig. 118, one of the knees; Fig. 119, the rocking lever; Figs. 120-121, staple and clutch; Fig. 122, the key, and Fig. 123, box containing wards for the key. These details are from a page in an Encyclopædia of Arts and Sciences of 34 volumes, the first dated 1751

Georgius Agricola

De Re Metallica

Translated from the first Latin edition of 1556 with Biographical Introduction, Annotations and Appendices upon the Development of Mining Methods, Metallurgical Processes, Geology, Mineralogy and Mining Law from the earliest times to the 16th century

By

HERBERT CLARK HOOVER

A.B. Stanford University, Member American Institute of Mining Engineers, Societé des Ingenieurs Civil de France, American Institute of Civil Engineers, Fellow of Royal Geographical Society, etc., etc.

And

(MRS.) LOU HENRY HOOVER

A.B. Stanford University, Member American Association for the Advancement of Science, National Geographical Society, Royal Scottish Geographical Society, etc., etc.

Published for the Translators by
The Mining Magazine,
Salisbury House, London, E.C.
1912.

The following excerpt from the Hoover translation will suffice to show clearly the primitive method of reducing iron ore to regulus or the metallic form in the sixteenth century, and, incidentally, it is interesting to observe that gas masks were used even at that day:

Very good iron ore is smelted in a furnace almost like the cupellation furnace. The hearth is 3½ ft. high and 5 ft. long and wide; in the center of it is a crucible 1 ft. deep and 1½ ft. wide, but it may be deeper or shallower, wider or narrower, according to whether more or less ore is to be made into iron. A certain quantity of iron ore is given to the master, out of which he may smelt either much or little iron. He, being about to expend his skill and labor on this matter, first throws charcoal into the crucible and sprinkles over it an iron shovelful of crushed iron ore mixed with unslacked lime. Then he repeatedly throws on charcoal and sprinkles it with ore, and continues this until he has slowly built up a heap; it melts when the charcoal has been kindled and the fire violently stimulated by the blast of the bellows, which are skilfully fixed in a pipe. He is able to complete this work sometimes in eight hours, sometimes in ten and again sometimes in twelve.

In order that the heat of the fire should not burn his face, he covers it entirely with a cap, in which, however, there are holes through which he may see and breathe. At the side of the hearth is a bar which he raises as often as is necessary, when the bellows blow too violent a blast, or when he adds more ore and charcoal.

He also uses the bar to draw off the slags or to open or close the gates of the sluice through which the waters flow down on the wheel which turns the axle that compresses the bellows. In this sensible way iron is smelted out and a mass weighing two or three *centumpondia* may be made, providing the iron ore is rich. When this is done the master opens the slag-vent with the tapping bar and when it has all run out he allows the iron mass to cool. Afterward he and his assistant stir the iron with the bar and then, in order to chip off the slags which had until then adhered to it and to condense and flatten it, they take it down from the furnace to the floor and beat it with

large wooden mallets having slender handles 5 ft. long. Thereupon it is immediately placed upon the anvil and repeatedly beaten by the large iron hammer that is raised by the cams of an axle turned by a water wheel. Not long afterward it is taken up with tongs and placed under the same hammer and cut up with a sharp iron into four, five or six pieces, according to whether it is large or small. These pieces, after they have been re-heated in the blacksmiths' forge and again placed on the anvil, are shaped by the smith into square bars or into ploughshares or tyres, but mainly into bars. Four, six or eight of these bars weigh one-fifth of a *centumpondium*, and from these they make various implements. During the blows from the hammer by which it is shaped by the smith a youth pours water with a ladle onto the glowing iron, and this is why the blows make such a loud sound that they may be heard a long distance from the works. The masses, if they remain and settle in the crucible of the furnace in which the iron is smelted, become hard iron which can only be hammered with difficulty. From these they make the iron-shod heads for the stamps and such like very hard articles.

In an explanatory footnote the authors say that in the description of iron making we have three processes described, the first being the direct reduction of malleable iron from the ore, the second the transition stage then in progress from the direct to the indirect method by way of cast iron; the third a method of making steel by cementation. The first method is that of primitive iron workers of all times and all races, and requires little comment.

A pasty mass was produced which was subsequently hammered to make it exude the slag, the hammered mass being the ancient bloom. The second process is of considerable interest, for it marks one of the earliest descriptions of working iron in a furnace similar to a blast furnace, but much wider and higher. This original German stückofen or high bloomery furnace was used for making masses of wrought iron under essentially the same conditions as its progenitor the forge, only upon a large scale.

With high temperatures, however, such a furnace would if desired, yield molten metal and thus the step to cast-iron as a preliminary to wrought iron became very easy and natural; in fact, Agricola mentions above that if the iron is left to settle in the furnace it becomes hard. The making of malleable iron by subsequent treatment of the cast iron—the indirect method—originated in about Agricola's time and marks the beginning of one of those subtle economic currents, destined to have the widest bearing upon civilization.

With regard to the history of treasure chests, the Encyclopædia Britannica states that, "Although it is practically certain that boxes or coffers, provided with locks, must have followed closely on the development of locks and have been in use in ancient Egypt, no examples remain of earlier date than the Middle Ages. The earliest examples extant were constructed of hard wood banded with hammered iron and subsequent development took place rather on artistic than on practical lines up to the time of the introduction of boxes entirely of iron. On the continent of Europe the iron box was developed to a very high standard of artistic beauty and craftsmanship, but with no real increase in security.

Several specimens of these coffers, supposed to be of 17th century workmanship, are preserved in the museum at Marlborough House. Cast-iron chests seem to have been made in various parts of Great Britain in the early part of the 19th century, but the use of wrought iron was probably confined to London until 1820 or thereabouts, when the trade spread to Wolverhampton. Nelson's Encyclopædia says:

German and Flemish chests were constructed of small iron plates, riveted together by overlapping bands of iron, and their lids were fastened down by staples and padlocks; the inside of the lid was covered with spring bolts shooting out in all directions and worked by means of bell cranks, levers and rods from a central lock having a box of wards.

The most elaborate book in the English language upon this special subject is entitled:

ANCIENT COFFERS AND CUPBOARDS—Their History and Description from the Earliest Times to the Middle of the Sixteenth Century. By Fred Roe.

The author says:

Two ancient and exceedingly interesting specimens of the iron-bound strong box remain in the chapel of the Pyx at Westminster. This chapel, the ancient treasury of England's kings, is little known, and access is even now jealously guarded. At the beginning of the fourteenth century while Edward the Lion was busy hammering the Scots, a strange and mysterious robbery caused the translation of the royal treasury to a more secure place. One hundred thousand pounds in English money alone is said to have disappeared, besides jewelry and plate. The theft to this day remains a mystery.

The treasure chest in Pyx chapel said to have belonged to Edward III is fitted with triangular handles on back and front, and at the ends are rings depending from movable bars. When required for purpose of transport, a pole would be passed through these rings and the coffer would be slung across the backs of two mules. "This attachment is really an early feature, and may be seen on an undoubted thirteenth-century coffer in the Museum of Ypres."

The chest shown in the photograph is constructed of an exceedingly strong wrought-iron framework with wrought-iron plates riveted thereto, apparently two or more plates superimposed, reinforced with broad bands of iron, neatly pressed, and there are 220 large and small rivets visible, but there are more rivets that could be seen only by taking the box apart.

The steel of the springs is of very excellent material, combining strength and elasticity to an unusual degree. No name has been found engraved upon the ornamental plate covering the lock, and it is not possible to fix the precise date of its manufacture, but other similar treasure chests, having precisely the same form of lock and ornamentation closely resembling this one, are still preserved which are classified as "Elizabethan treasure chests," dating back to about 350 years ago, and it would seem probable, therefore, that this old box belongs to the same period.

The Canadian Government has decided for the present and until further notice to permit under license the free export of the metals molybdenum and tungsten, their ores, concentrates, alloys and chemical salts to approved consignees in the United States and France. This will relieve the situation that has been considered somewhat oppressive to Canadian producers. Since an embargo was placed on the export of these metals the market for the Canadian production has been confined very largely to purchases made on account of the British Government at fixed prices. These fixed prices have been lower, at times considerably lower, than the open market prices offered in the United States and France. The requirements of the British Government are being met and the Canadian producers will now be permitted to take full advantage of the open markets in the United States and France.

The Industrial Disintegration of Russia

An American Engineer's Personal Observations — After Famine, Will Come Restoration Under Allies' Financing

BY STERLING H. BUNNELL*

BEHIND the dust clouds of political revolution which hide the internal and domestic affairs of Russia there has been going on a most astonishing process of disorganization. It was not through any insidious plot of socialists or anarchists that present conditions were brought about; on the contrary, the same disastrous result might follow a general strike such as has been used repeatedly by extremist unions among English and American laborers. When a workman through bad health, laziness or drink begins to lose his interest in his work, he starts for himself and his fortunes a process which, if unchecked, will in a year or two reduce him to the rank of a "down-and-out." This process is now far advanced in Russia, and we might well fear the future influence of a huge horde of barbarians but for the fact that powerful counter influences are already apparent in the Russian's natural patience under difficulties, his love of order, and his degree of civilization, by no means inferior to our own. Every Russian, from least to greatest, excepting only a small fraction of extremists of the extreme, is sick to death of the condition to which his country and his friends have sunk because of abandoning fixed habits of work. At any moment a real leader may appear, with strength of character enough to inspire confidence and faith, and the restoration of Russian industry will begin and proceed rapidly. Meanwhile, it will be interesting to trace the course of events by which a great nation producing a surplus of goods for export was reduced to a disorganized country of individuals, each subsisting almost by his unaided efforts, like a tribe of nomads in tents.

A Workers' Riot at the Start

The Russian revolution was precipitated by the general lack of food for the working classes in the city of Petrograd. The governmental structure fell like a house of cards before a puff of wind. The police, together with many officers of army and navy, paid with their lives for the severity and cruelty of the old system to which they had belonged. A peaceful demonstration intended to induce the government to provide food for the people turned suddenly into an armed attack on those who would have repressed it, and resulted in the complete destruction of the government; but it failed of its original purpose of providing food. Some stocks of grain were found, but not in sufficient quantity to satisfy the popular need. The workers of Petrograd, Moscow and the other large cities, who already received wages much larger than before the war, could not spend all their earnings for food and clothing because there was not enough of either to be had at any price. Therefore, they felt no pressure keeping them at work, and deserted their jobs freely to talk things over, elect committees and formulate demands for shorter working hours as well as higher wages.

The first demands of the workingmen were freely granted by the employers. Every one knew that the Russian workmen had been underpaid in former years, and all felt the common pressure of the high cost of living in the war time. But the ease with which the first concessions were secured emboldened the workmen to strike for more. At the same time, those whose pay was first increased bought goods from the already depleted stocks in the shops and so further decreased the amount of goods on sale, and the shopkeepers naturally marked up the prices on what remained. The effect of raising wages was therefore to increase prices and reduce the quantity of goods on hand. Strikes accordingly multiplied and the eight-hour day being quickly secured, wage increases up to 400 per cent in some instances were demanded, in the endeavor to make the day's wage-rate cover the market price of the family supplies. The inevitable result was to exhaust the stocks of goods for sale, and to tempt the workman to lay off one, two or more days in the week rather than work for more money than he could spend.

Production Everywhere Decreased

Between shorter hours, lost working days and general indifference of the man to his job, the output of every institution in the country decreased rapidly. Miners took out less coal and ore; railroad hands made less mileage, destroyed cars and locomotives in careless wrecks, and wasted time in making repairs; factory hands wasted materials and abused machinery, and the peasants ceased to cut firewood for the cities to use in the coming winter. As the summer advanced prices of vegetables and fruit were found to be so high that a man could make more money by bringing in a basketful of produce and selling it on the sidewalk than he could formerly make by bringing in a wagon-load; and so peddling in small quantities became the rule, and there was no incentive to supply adequate amounts to the city workers. In the growing disorganization of trade, staples like milk, butter and bread often failed for a day or two, and gradually tea, coffee, sugar and cigarettes disappeared from stock and could be had only occasionally. It was only necessary to put a sign in a window stating that a limited quantity would be permitted to each purchaser in order to collect a long queue of buyers who would stand in line for hours to buy the maximum.

The difficulties of daily life were increased by the destruction of all discipline in the army. The soldiers quartered in the cities shared with the army in the field the socialistic right to depose or elect their officers and obey or disobey them at pleasure. Consequently drill was abandoned, order and routine were at an end, and the men walked the streets by day or night as they pleased. Some amused themselves riding on the street cars without paying fare, displacing paying passengers. It was estimated in Moscow that 60 per cent of the passengers were such soldiers. Others took places in queues and bought citizens' shares of whatever was

*Mr. Bunnell recently returned from a year's tour of the world in the interest of R. Martens & Co., New York, of which he is chief engineer. He spent considerable time in Russia and made a careful study of industrial and trade conditions there.

for sale and then peddled the goods to civilians at a large profit. Others again hung around the railroad stations and carried passengers' baggage as porters, with the advantage of being able to steal handbags easily and disappear without trace among the crowd of uniformed men. There was no white flour in the market; but it could be bought from a soldier, and so could sugar and everything else which could be stolen from the military stores.

"Comrade" Committees Replace Experience

Groups and committees multiplied everywhere. The first provisional government had been composed of men of experience in national affairs, but it was soon forced out and replaced by "comrades" of the socialistic groups, each subject to instant recall if he expressed any positive personal opinion. None of the "comrades" dared take a firm stand on any matter. The power passed from the provisional government into the hands of the committees of soldiers, workmen and peasants, whose membership, it was carefully explained, "were not (as falsely alleged) limited to those who could read and write."

The most aggressive members of the committees were naturally those who stood for the unlimited right of the individual to seize what he considered to be his share of the world's goods. Naturally, the confirmed criminals who were liberated along with the political prisoners in the first days of the revolution joined with the extreme individualists, took up arms and proceeded to march and make speeches with the anarchist crowds by day, and rob people and houses by night. In the theory that all men were well-meaning brothers (except the capitalists), it was impossible to separate the criminals from the others. A large group of these people seized and held for several months a country house near Petrograd and defied the orders of the provisional government to vacate the premises. When the government finally plucked up courage to send soldiers and enforce its demands, a count by one of the old experienced police officers disclosed the fact that over half of the men arrested at the country house were convicts who had been sentenced to long terms in prison for all sorts of crimes and violence.

Prices and Wages Go Soaring

From the date of the revolution the financial condition of Russia steadily grew worse. In the excitement over schemes for dividing among the peasants the crown lands, or the lands of all owners of large estates, or all property of foreign citizens, etc., etc., the government had no time to devise systems of taxation or collect revenue for its needs. Instead, the printing presses were kept running day and night, printing paper money of all denominations in enormous quantities, with which the government paid its bills. Six months ago it was stated that the volume of paper money had reached twenty times the gold reserve; and much more paper has been issued since. Naturally, the value of the currency decreased and prices rose. Wages, however, were easily forced up by strikes, or by mere threats to strike. In the endeavor to check the fall of the rouble, the government forbade the payment of money to foreign banks by exchange transactions, so that drafts for goods on the way to Russia could not be met; and finally prohibited imports of all kinds except under permits, which were extremely hard to obtain. The effect, as is always the case when arbitrary restrictions are placed on trade, was to increase the tendency which it was hoped to diminish. The demand for imports was so extreme that the laws were evaded, but the price of exchange transactions rose with the risk of doing illegal business, until the rouble fell to a value of seven cents; and it is still falling. At this rate, nothing but food stuffs and clothing could be sold, for these necessities must be had at any price.

Middle Men Abolished, Grain Rots

We know Russia as an agricultural country, normally producing a large surplus of grain and animal products, besides minerals. It was astounding to find the provisional government filling the newspapers with appeals for food for the army and the cities. Here again a monkey wrench had been thrown into the mechanism of trade. Some of the peasants had failed to plant their land, or to cultivate their crops, with the idea that they were about to be given vast tracts of better ground in the general division of wealth, but most of the farmers had proceeded as usual from force of habit. The socialist government had proclaimed the grain merchant a "middleman," grinding the poor by usurious profits, and legislated him out of business by fixing a high price for grain, to be paid direct to the peasant by the government. But the impractical men at the head quite overlooked the fact that the middleman was the active link between the grain field and the mill. The peasants cut and stacked their grain as usual; but no one came to look at the grain, thrash it, direct when and where it should be delivered by wagon, and pay for it. The peasants had no barns in which to store the crops, and so large quantities of grain lay in the fields to rot, while thousands of soldiers and civilians within a few miles went hungry.

Industry Disintegrates

In this way the entire industrial structure of Russia gradually disintegrated. Factories worked up their stock and closed; owners of plants paid out their last rouble in meeting exorbitant demands for increased wages, and then the men had to go home. Some works attempted to close earlier, but were ordered to continue operations and so ran till the money was gone. In many instances the workmen seized the factories from owners willing or unwilling. The course in such cases was frequently to sell out everything on hand for what it would bring and divide up the proceeds. It was stated last summer that the wastage on railroads was such that half the rolling stock had disappeared from the lines during the previous twelve months. A similar shrinkage could be observed everywhere. Stores were sold out down to the last shelf. About the only goods left were those displayed as samples in the windows, and these were not for sale. For months the nation had been producing less than it consumed, and the inevitable result had come to pass.

The reversal of the process cannot be long delayed. As soon as the Russians begin to work industriously affairs will begin to mend. They will hardly think this out for themselves and consciously start to make things better; but rather, cold and hunger will force men and women into begging any kind of work for any pittance so that they can buy a bit of food. With production beginning in excess of consumption, conditions will improve. Labor will be available to move the goods awaiting export, and in return for these imports will be sent from other countries. Habits of industry will assert themselves, and the industries of the nation will be resumed.

Allies Must Re-Finance Russia

Undoubtedly, Russia must come to the Allies for further loans to use in re-stocking the country. Such loans cannot be refused, because the investments of the Allies in Russia are already too great to be abandoned. The position is precisely the same as that when an investment has been made in a factory which has since got into difficulties and must be re-financed or wound up for a heavy loss. Whatever the sentiment of the individuals at present claiming to speak for Russia, the nation cannot exist without clothes and shoes, tea, tools and machinery, and must buy these in Allied markets on Allied terms, because the German shopkeepers are not in position to furnish the quantities needed. For the moment business with Russia is virtually at a halt. When the dreamers and talkers are exhausted with the effort to live on promises and decide to go to work, business will be resumed on a scale beyond anything ever recorded.

New Priority Rules

WASHINGTON, Jan. 29.—Some important reforms in the issuance of priority orders for the movement of material are about to be put in force by the War Industries Board. While the changes have been in contemplation for several weeks, the board now regards them as especially timely in view of the railroad congestion, the industrial shutdowns and the extraordinary efforts now being made to supply the shipyards of the country and the American forces in France.

When the system of issuing priority orders was first adopted, the subject was very conservatively handled, but as time passed and the necessity for speeding up war preparations became more insistent, the requirements were gradually relaxed until priority orders have become so numerous as largely to defeat the purpose for which the system was adopted. It is obvious that it is a simple matter by giving preference indiscriminately to orders for material, transportation, etc., to produce a condition in which such preference means nothing at all. The War Industries Board has decided, therefore, to prescribe more stringent regulations and especially to require applications for priority orders to furnish more information concerning their needs in order that the board may more intelligently judge of the necessity for the desired order.

The board within a few days will issue a new priority circular to be known as Priority Circular No. 3, which will contain additional general information about the priority system and which will be forwaded upon application to the Council of National Defense.

British Munitions Output Growing

According to the London *Times*, the British output of munitions is constantly on the increase. Nearly 10,000 workshops in Great Britain are now producing munitions of war. Of these 5000 are establishments controlled by the Ministry of Munitions, and 150 are national factories. The output of material of all kinds is on an immense scale, but the limit has not been reached. The erection of four new national factories at a cost of over $10,000,000 has just been sanctioned and extensions are being carried out in many areas. Existing workshops are being enlarged; a new factory is being built for the readaptation of old boxes and packing cases from the battlefields; aircraft and instructional factories are being established, and almost every week there are demands for other variet e of building subsidiary to the production of munitions.

The Berger Mfg. Co., Canton, Ohio, has placed in operation two of its ten new sheet mills, increasing its production about 16,000 tons annually, and expects to have the remaining eight mills ready for operation in about 60 days.

OUR FERROMANGANESE OUTPUT

That for 1917 Exceeded All Records—Available Supplies—Spiegeleisen Output Less

THE output of standard ferromanganese in the United States in 1917 exceeded all records. It was 257,834 gross tons or nearly 50,000 tons in excess of the previous high record of 208,389 tons made in 1916. It is twice the output of 1912, when it was 125,378 tons. The following table, based on the monthly blast furnace reports of THE IRON AGE, gives the output of ferromanganese and spiegeleisen in the United States in the past 6 years:

Ferromanganese and Spiegeleisen Output in the United States —Gross Tons

	Ferro-manganese	Spiegel-eisen	Total	Average per Month
1917	257,834	188,852	446,686	37,222
1916	208,389	197,518	405,807	33,817
1915	146,542	93,282	239,824	19,985
1914	106,083	100,365	206,448	17,204
1913	119,495	126,081	245,576	20,464
1912	125,378	119,506	244,884	20,407

While the expansion in 1917 was not as great as that in 1916, it was creditably large. The shrinkage in the spiegeleisen output was unexpected and while the decline is not large the total is twice that of 1915.

Details of the production, imports and exports of ferromanganese for the first half of 1917 were published in THE IRON AGE Dec. 6, 1917. For the last half the following table shows the details as well as the average for the first half:

Domestic Output, Imports and Exports of Ferromanganese in 1917—Gross Tons

	Output	Imports	Exports	Available Supply
July	23,949	2,037	629	24,991
August	24,482	2,840	453	25,357
September	23,973	3,402	57	26,869
October	26,591	2,035	3,406	27,318
November	20,829	1,512	112	25,229
December	18,657	2,959*	....†	21,616
Total	138,481	14,785	4,657	....
Total to July	119,353	30,596	....	....
1917 total	257,834	45,381	4,657	....
Monthly av., first half	19,892	5,099	....	24,991
Monthly av., last half	23,080	2,464	776	25,230
Monthly average in 1917	21,486	3,703	....	25,110
Monthly average in 1916	18,641	7,577	....	....
Monthly average in 1915	12,021	4,605	....	....
Monthly average in 1913	9,958	10,672	....	....
Monthly average in 1912	10,448	8,261	....	....
5 yr. av., 1910-14	8,280	8,399	....	....

*Unofficial: other import figures official.
†Not yet reported.

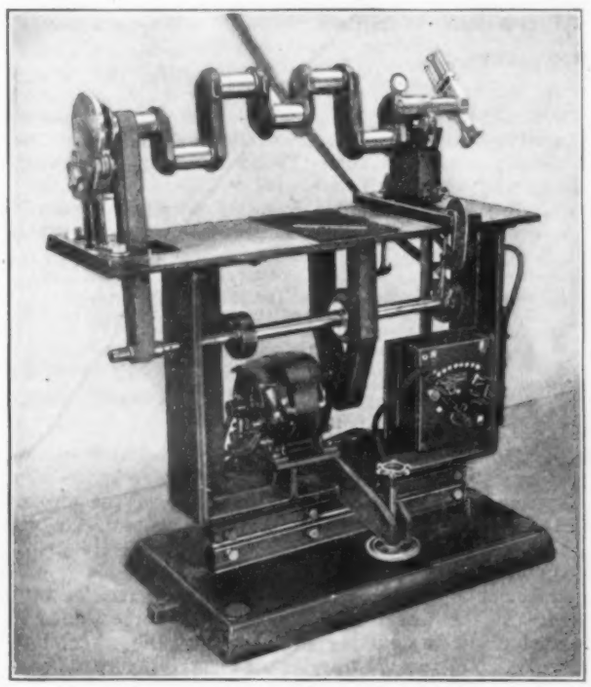
These figures show how the domestic output has been steadily climbing until in the last half of 1917 the monthly output was almost double that for 1915 and over twice that of 1912 which was the pre-war record. October was the banner month of 1917 with 26,591 tons, since which time the output has decidedly declined.

The striking and significant fact is the dwindling of the imports from England. In 1917 they were only at the rate of 3703 tons per month and had declined in the last half to 2450 tons per month. In 1913 these imports constituted one-half of the available supply of this important steel-making alloy but now they are only about one-sixth.

Soon after the entrance of the United States into the war it was officially estimated that the steel industry of the country needed 28,000 tons per month of ferromanganese. The foregoing table shows an average available supply for 1917 of 25,032 tons per month. In THE IRON AGE, Dec. 6, 1917, it was estimated that, based on a steel output in 1917 of 44,000,000 tons, the ferromanganese necessary would be 309,190 tons. Adding the 1917 production of 257,834 tons to the imports of 45,381 tons, we have a total available supply for the year of 303,215 tons. Allowing for the usual indiscretions in estimates of this character and the use of spiegeleisen as a partial substitute, the deficiency is not alarming. This is all the more evident when it is recalled that the present rate of steel output is considerably below 44,000,000 tons per year.

New Static and Dynamic Balancing Machine

Discussing recent developments in balancing apparatus before the American Society of Mechanical Engineers at its annual meeting in New York, Dec. 5, N. W. Akimoff, Harrison Building, Philadelphia, held that the accuracy with which dynamic unbalance can be corrected depends on the perfection with which static balance previously has been established. Static unbalance, manifested as a couple tending to rotate the stationary body about its horizontal axis, he said is not easily or accurately determined by parallel ways, and for this reason he has extended some principles of his original balancing machine described in THE IRON AGE, April 20, 1916, to a new machine designed to measure both static and dynamic unbalance.



The Yielding Support at the Right Has Means for Adjustment of Its Period, as Likewise Has the Frame Itself. The motor is of ½-hp. capacity and operates the body, through a countershaft, by a rubber belt. The balancing clamp is seen on the extreme right of the crankshaft. The oscillations are read by means of ordinary Starrett dial gages, graduated in thousandths of an inch

A diagrammatic illustration of the principal features of the machine is shown, as is also a reproduced photograph of the machine itself. The unbalanced body is shown in the diagram as T and is rotated within the frame. The bearing C may either be locked, so that it acts like the rigid bearing B, or it may be allowed to float in a vertical plane, bringing into play springs opposing its deflection from the neutral position. The correcting centrifugal force is indicated by K. Brackets S may be adjusted to maintain the frame rigid or permit it to swing freely. When the frame is free and C is locked and the body rotated static unbalance is indicated by oscillations of the frame, which stop when the determining force K counteracts the effects of unbalance. When the frame is held rigid and the bearing C is unlocked vertical vibrations of the rotating body indicate dynamic unbalance, dynamic unbalance being due to a couple tending to rotate the body about B as a pivot.

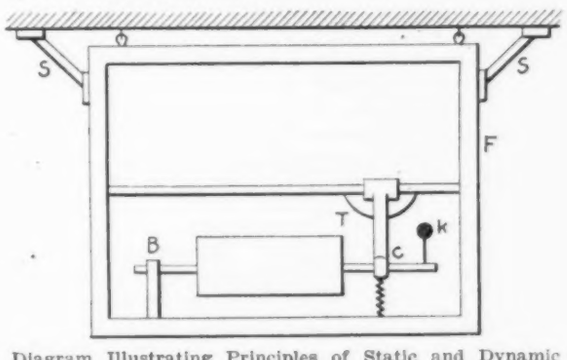


Diagram Illustrating Principles of Static and Dynamic Balancing Machine. When clamps S are removed oscillations of the frame indicate static unbalance. When the frame is held rigid oscillations of the body T indicate dynamic unbalance. K is adjusted in each case so that the oscillations cease

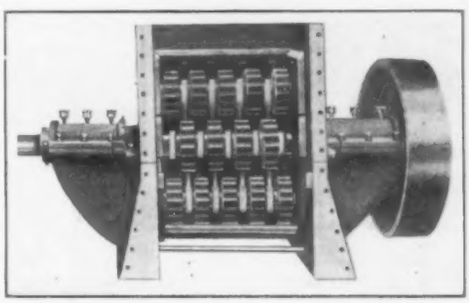
Roll Type of Pulverizing Machine

For grinding hard material the Excelsior Tool & Machine Co., East St. Louis, Ill., has brought out a roll type pulverizing machine. Material of a plastic formation, it is pointed out, cannot be handled as it would have a tendency to clog the grinding plates, but iron and manganese ores, silica rock, coal, coke, or any material that can be ground by fracture can be pulverized.

Three sets of rolls are provided. These rollers, which are either of the cylindrical or the fluted type, are held in place by four shafts 2 in. in diameter which in turn are held in position by cast steel spiders keyed to the main shaft.

The design of the machine is such that not only the revolving force of the rotor, but the centrifugal force of each roller is utilized and all parts of the machine as well as the grate bars can be readily removed. The material is forced out through a grate surface in the lower half of the housing and to use this space efficiently, the rollers overlap.

The equipment of each machine includes a belt tightener and an extra pulley on the opposite side of the driving pulley. Both pulleys are interchangeable and can be used on either the right or the left side of the machine, the additional pulley, which is 10 in. in diameter with a 10-in. face, being intended for use as a drive for elevators, conveyors, etc., in connection with the finished product. In all, five sizes of the machines are built providing for different quantities of ground material. The dimensions of the different sizes are the same, the machines being 48 in. long and 53 in high. The speed of operation is the same for all sizes, 500 r.p.m.



Either Fluted or Plain Cylindrical Rollers Can Be Employed in a New Machine for Grinding Hard Material of All Kinds

The L. S. Starrett Co., Athol, Mass., has issued a notice to employees setting forth a bonus distribution shortly after Jan. 1. Based upon the amount of wages paid to each employee during the past six months, ending Dec. 31, the company will give a bonus of 4 per cent to those who have been in its employ for one year or less; 6 per cent to those who have been continuously in its employ for over one year and less than three years; 8 per cent to those of over three and less than five years' standing, and 10 per cent to all employees who have been with the company continuously five years or over. The company makes the suggestion to those participating to invest the funds in Liberty bonds, war saving certificates or thrift stamps.

The Industrial Commission of Wisconsin reported on Dec. 22 that during the last half of 1917, industrial accidents in Wisconsin workshops and factories showed a reduction of 14 per cent from the corresponding period of 1916. This is due to the special effort made by the commission to interest foremen and shop superintendents in safety and sanitation work.

The Grinding Wheel in the Foundry*

Several Factors Contributing to Their Economical Use Including Selection, Mounting, Operation and Speed

BY W. T. MONTAGUE†

THE following factors contribute to the economical use of grinding wheels in the foundry, if they are understood and taken into consideration:

1.—A thorough understanding of the grinding wheel as a cutting tool.

2.—The castings to be ground, with special reference to their size and shape, the physical properties of the metal, and the amount of grinding to be done.

3.—The condition of the grinding machines. This refers to weight and rigidity, solid foundations, adequate bearings and proper lubrication.

4.—The speed of the grinding wheel. This must be held within certain limits if proper cutting action and economy in wheel consumption are to be obtained.

5.—The personal factor.

6.—Adequate records of wheel consumption. If conditions warrant, industry and economy on the part of the workmen should be properly rewarded.

7.—The use of the grinding wheel should be made safe by proper protection devices.

The composition of the vitrified grinding wheel, which type is almost always used for snagging castings, is as simple as its manufacture is complex. It is made of abrasive grain, clay bond and water. Subsequent burning in a kiln and heat treatment vitrifies the bond and produces that quality termed "hardness." The selection of abrasive material is almost entirely dependent upon the nature of the metal to be ground.

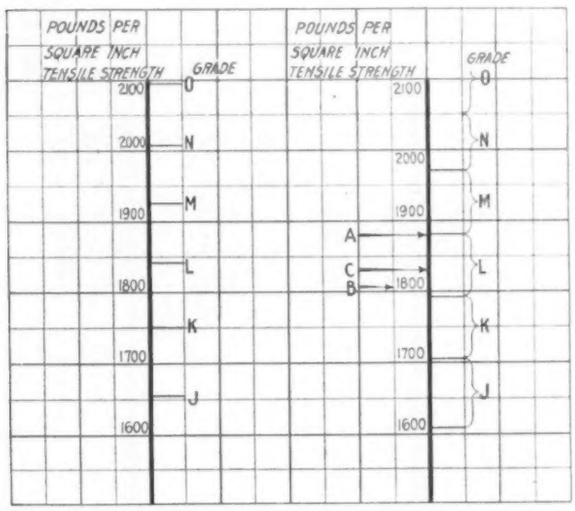


Fig. 1—Breaking Strength of Grinding Wheels of Various Grades

Fig. 2—Range in Breaking Strength of Wheels of Various Grades

There have been developed for cutting the metals used in castings to-day two principal kinds of artificial abrasive—the aluminous group and the carbide of silicon group. Included in the former are alundum, aloxite, boro-carbone, adamite and the like, and in the latter group crystolon, carborundum, carbolite, etc. Experience has shown that for materials of high tensile strength, the aluminous abrasives prove the most efficient. This means that the various kinds of steel, wrought iron and annealed malleable iron, automatically call for an abrasive such as alundum. On the other hand, crystolon is chosen for cast iron, including gray and chilled iron, unannealed malleable iron, brass, bronze, aluminum and copper, which are materials of comparatively low tensile strength. This distinction is clear cut and quite easy to remember.

The Question of Grain Size

The question of what size of grain to use is not difficult to settle. The size of the wheel, amount of material to be removed, and the nature of the metal usually determine this. Finish is seldom a consideration and coarse grits are used.

How hard to bond a grinding wheel is a point not so readily determined. The influencing factors are many, including:

1.—Physical properties of the metal to be ground.

2.—Shape and condition of the surface to be presented to the face of the grinding wheel.

3.—Speed of the grinding wheel.

4.—Condition of the grinding machine as to rigidity and steadiness of spindle.

5. Method of applying the work, that is, whether mechanically or entirely by hand.

"Grade" is used to designate the relative hardness of any given grinding wheel. By hardness, we do not in this instance refer to the hardness of the abrasive, which is fixed throughout any one wheel. We refer to the strength of the bond in retaining its grip on the cutting grains of the wheel. If the bond is of insufficient strength to hold the cutting particles in the face of the wheel until they have become dulled and worn from the cutting process, then the wheel is too "soft." On the contrary, an excessively "hard" wheel is one where the bond retains the grit long after it has become dulled and is therefore practically useless. A grade is not an exact value or a definite point in the scale of hardness. It is a range between limits and all wheels which test within this range carry the same grade letter.

One way to measure the strength of the bond is to revolve a grinding wheel at increasing speeds until it bursts. Knowing the bursting speed, the centrifugal force necessary to cause the bond to break down can be readily calculated.

In order to obtain Fig. 1, a lot of wheels were speeded up to a point where the fiber stress, due to centrifugal force, exceeded the strength of the bond and breakage occurred. All of these wheels were of the same size, with the same grit, but of different degrees of hardness. The grade *J* broke when the stress was 1650 pounds per square inch, the grade *K* at 1750 pounds per square inch, and so on. Therefore, one might infer that all grade *J* wheels would burst when this same stress was reached.

Grade Not an Exact Value

Now consider Fig. 2 and let us see what really happens when several wheels of supposedly the same grade are tested. We find that those that have been determined to be of grade *J* hardness will burst at stresses ranginng from 1600 to 1700 pounds per square inch, grade *M* at from 1880 to 1990 pounds per square inch and so on. In other words, a grade represents a range of values between definite limits. An understanding of this point is most essential to the users of grinding wheels and will explain many seeming variations in grinding wheel action and life.

Assume a certain snagging operation is being performed, whereby all the factors combine to bring a pressure against the grain on the face of the wheel which causes a stress represented by arrow *C*, Fig. 2. Bear in mind that this is a tangential or peripheral stress, so to speak, not a stress due to centrifugal force. The wheel whose bond has a strength represented by arrow *A* will have a longer life than one represented by arrow *B*. This last wheel will not be bonnded strong enough to withstand the grinding forces and will wear away quite rapidly, in fact, much more rapidly than the difference in strength or hardness would seem to warrant. This point has been developed

*From a paper read at the annnual meeting of the American Foundrymen's Association at Boston.

†Norton Co., Worcester, Mass.

in detail because an understanding of it will eliminate many questions arising between the wheel manufacturer and the wheel consumer.

In order for a wheel to cut fast and free, it is necessary for it to wear—that is, for the bond to release those grains that have become dulled and useless. From this it is seen that the grain, which has to the greatest degree the physical property of hardness (we refer to mineralogical hardness), combined with sharpness, is the most efficient and will do the greatest amount of useful work before dulling. It is these very qualities that make alundum superior to the softer and more impure abrasive, emery, which dulls rapidly under cutting pressures.

A set of experiments recently were carried out, showing how the condition of the face of a grinding wheel affects its cutting action, its ability to remove metal and the power consumed in doing this. The results are shown in Fig. 3. Section *A* of the curve shows the no-load power. Then a bar of steel was applied to the wheel under a given pressure and this pressure was held constant throughout the test. First, the power consumption climbed abruptly as the sharp cutting grain bit deeply into the metal. After two minutes of this rapid cutting, we reached the glazing point and the line *C* resulted. At *D* we were working with a wheel, the cutting points of which were nearly all worn down flat. The power consumption was low because there was practically no useful work being done. At *E*, the steel began to heat and become sticky, so that particles began to load and smear into the pores of the wheel face. The power now climbed again, but still practically no useful work was being done. At *F*, or even before this point was reached, the wheel should have been dressed or resharpened. This aptly illustrates the folly of using a wheel that is too hard or dense to cut freely without resorting to continual dressing.

Action of an Ideal Wheel

The action of the ideal wheel is pictured in Fig. 4. This shows that the glazing period is no sooner entered upon, than the bond suddenly gives way and releases the dulled teeth. New and sharp grains take their place and the cutting is resumed at very nearly the initial rate. A wheel of the correct grain and grade for the operation at hand can oftentimes be dressed by the additional application of pressure on the part of the operator, or by presenting the very sharpest fins on a casting to the wheel face under increased pressure. This means that useful work is being performed while sharpening the wheel, with practically no lost time or wear of dresser cutters. It is this condition that all should aim for in selecting snagging wheels and the workmen should be educated to this kind of grinding. Some think it is not true that in order to make a wheel cut, you must force it exceedingly hard if the wheel is not excessively hard or fine for the work. A wheel of the correct grain and grade will cut faster if not forced.

Effect of Properties of the Metal

The next factor of importance to economy in the use of the grinding wheel is a knowledge of the effect of the physical properties of the metal to be ground. To say that a wheel is desired for malleable iron may not be enough. If the iron is of the annealed variety, then alundum or an aluminous abrasive should be employed, but if the iron has not been annealed, crystolon or some carbide of silicon abrasive should be used. Furthermore, white iron castings usually require wheels of much greater hardness than annealed castings.

It is a common saying that the harder the metal, the softer should be the grinding wheel. Strictly speaking, this applies only to precision grinding, certainly not to the snagging of castings. Let us consider manganese steel, which, as everyone knows, can be machined economically only with abrasives. This material offers a high resistance to penetration and hence, slightly finer grits are usually employed for snagging castings of manganese steel than would be used for ordinary carbon steel. Coarser grits would require more manual effort than could be expected from the ordinary workman.

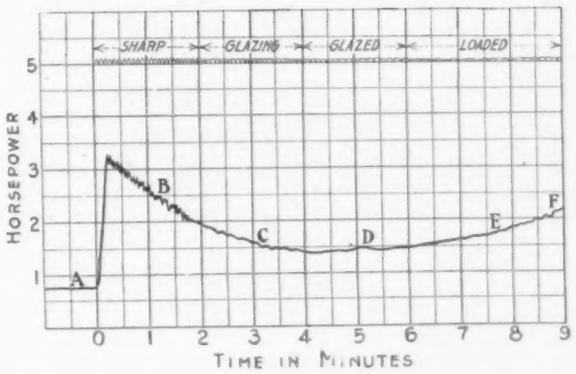


Fig. 3—Power Consumption Under Different Wheel. A, no load; B, power consumed by sharp cutting points of newly dressed wheel; C, cutting points beginning to dull; D, glazed condition—less bite and friction; E, loading—increase in friction, but no useful work done

Soft, stringy materials generally call for comparatively coarse grits and medium hard grades. Dense, brittle materials require slightly finer grains and harder grades, sometimes one or both.

The following table illustrates this to a little better advantage:

Metal	Grade of Wheel
Manganese steel castings	16-Q or R Alundum vitrified
Carbon steel castings	10-U Alundum vitrified
Brass castings	24-Q Crystolon vitrified
Chilled iron castings	16, 20 or 24-S, T or U Crystolon vitrified

It is no doubt well understood that the harder the fins and the sharper the contact, the harder must be the grinding wheel. This is necessary to counteract the dressing and tearing action of the projecting metal.

Grinding Steel Castings

In grinding steel castings, the breaking-off of gates and risers often leaves a very large volume of metal to be ground away. As the arc of contact thus increases there are increased loading tendencies, and sometimes a heavy, black oil is daubed on the metal, to keep the wheel open and thus reduce dressing. After much experimenting, a specially treated or filled wheel has been developed that automatically lubricates the cutting grains and often greatly lengthens the life of the wheel because of reduced dressing.

Condition of the Machine

We now come to the third factor, namely, the condition of the grinding machine. Economy cannot be expected if the machines are light and shaky, or if the foundations are not solid. A grinding wheel that vibrates or jumps from any of these causes is soon pounded to pieces by the percussion set up by the castings on the face of the wheel.

A test was conducted with wheels of the same size and same grain and grade, on the same machines and identical castings. One set of machines was mounted on concrete or solid foundations and the other on wood or shaky foundation. The results were as follows:

Average life of wheels on wood floor, days	113
Average life of wheels on concrete floor, days	188
Increase in life due to solid foundation, per cent	65
Average saving a month per wheel on concrete floor	$2.00
Average yearly saving per wheel	24.00

Where many wheels are used, this saving is a de-

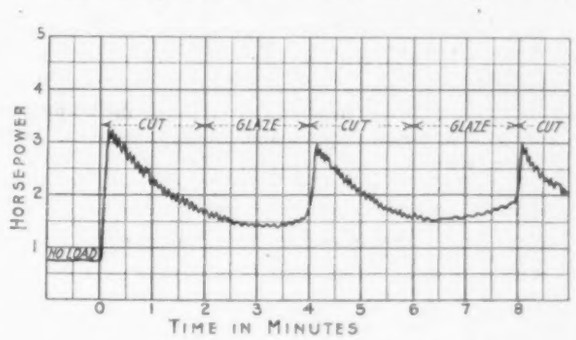


Fig. 4—Action of an Ideal Wheel

cidedly large and important consideration. In this case, the concrete foundation paid for itself inside of two months and the saving in wheels will go on indefinitely.

Similar figures could be produced to show the saving effected by keeping bearings in good condition. Excessive radial play and end play destroy the wheel rapidly. Many times complaints received to the effect that grinding wheels are not standing up as they formerly did, can be traced directly to bearing troubles. The introduction of harder grades, as for example, from grade *S* to grade *U*, only partially remedies matters because the speed of cutting is sacrificed and the operator has to put forth greater effort to do the same amount of work.

Grinding Large Castings

In the case of the medium-sized or large steel foundry, grinding quite a variety of castings, it is important to have the grinding machines properly arranged and grouped, so the work may be ground with a minimum amount of handling. Extremely large castings that must be ground in place should be gone over with wheels mounted on small portable electric, pneumatic or flexible shaft grinding machines.

Next should come a battery of swing-frame grinding machines to grind the medium heavy castings such as drawbars, locomotive wheels and other similar heavy castings that cannot readily be handled. These machines should be located where prompt crane service is to be had. Then finally, the smaller castings that can be handled easily should be ground on floor stands conveniently arranged.

A table showing the horsepower required to drive various sizes of bench and floor stands may prove of some help here. The values shown in the following table were measured under actual service conditions and may, therefore, be considered reliable guides in the selection of motors.

Horsepower Required to Drive Grinding Machines

Machine	Number of Hangers	Friction hp.	Total hp.	Net hp. Consumed	Size of Motor hp.	Wheels Used in Test
¾-in. Norton bench belt-driven	12	1.08	1.87	0.81	2	2—10 x ¾ at 5000 s.f.p.m.
1¼-in. Ransom bench direct-connected	2	0.75	3.00	2.25	3	2—12 x 1¼ at 5000 s.f.p.m.
1½-in. Norton floor belt-driven	5	0.95	3.88	2.93	4	2—16 x 1½ at 5000 s.f.p.m.
2-in. Norton floor belt-driven	11	1.30	4.75	3.45	5	2—24 x 2½ at 5000 s.f.p.m.
10 x 72-in. Norton cylindrical	2	2.50 to 3.00	10.00	7.50	10	1—18 x 2 at 5000 s.f.p.m.

Grinding Wheel Speeds

Generally speaking, the correct speed ranges for the grinding wheels used in snagging castings lie between 5000 and 6000 surface feet per minute. This range was determined partly by long years of experience and partly by physical laws and the desire for an adequate factor of safety. All snagging wheels made by reliable manufacturers are subjected to a speed test the last minute before being packed, that generates a centrifugal stress many times in excess of the stress prevailing under the recommended operating speed.

Furthermore, it has been shown there is no appreciable gain from faster speeds, at least not enough gain to offset certain drawbacks. It should be further remembered that the grinding wheel is designed to operate at approximately the recommended speeds and any appreciable deviation calls for adjustments that are not always easy to make or conducive to efficiency.

Keep Surface Speed Constant

It is now common knowledge that it is necessary to keep the speed of the grinding wheel approximately within the recommended range, if its productive capabilities are to be maintained. It has been demonstrated that if a wheel's speed is allowed to fall to a very low level, or if it is speeded up beyond a certain point, in both cases reduced cutting ability for the same amount of effort expended is the result. In the case of a subnormal wheel speed, not only does the productive capacity fall off, but also, there is excessive wheel wear.

To illustrate this point, let us consider the case of an 18-in. wheel, 10 grade *U* alundum, used for snagging steel castings. At 1175 revolutions per minute its peripheral speed is 5500 surface feet per minute, and it cuts and wears satisfactorily. If the revolutions remain the same, at 11 in. diameter, the surface speed is reduced to 3500 ft. Every cutting grain on the face of a revolving grinding wheel has a definite amount of energy stored up in it. It is the expenditure of this energy that enables the grain to do useful work and remove metal. Now the energy available varies as the square of the surface speed. Therefore, at 11 in. diameter, the cutting grains have only 40 per cent of the energy that they had at 18 in. diameter and they cannot be expected to grind as rapidly. Also, because of the decreased energy stored up in each grain of abrasive, it is less capable of withstanding the resistance offered by the steel and hence is more readily torn from its setting. This, then, explains the difficulty that will be encountered in attempting to grind at very low surface speeds.

On the other hand, if this same wheel was giving satisfaction at 5500 surface feet per minute, and an attempt were made to speed it up to 7000 surface feet, no greater production would be realized. This is due to the glazing effect resulting from the increased duty imposed on each abrasive grain.

Keeping a fairly constant surface speed by increasing the revolutions as the wheel wears down, is the proper procedure for maximum cutting ability with minimum wear.

Excessively Hard Wheels

When a user of grinding wheels wishes to avoid the trouble of maintaining fairly constant surface speed, he invariably tries to keep his wheel life up by using wheels of excessively hard grade. The immediate effect of this is increased power consumption and decreased speed of cutting, neither of which are desired. Fig. 5 shows that regardless of speed, successively harder grades require more and more power to remove the same amount of material.

It is, therefore, quite evident that economy in wheel life comes from maintaining fairly constant surface speed as the diameters of the wheels are reduced. This can be brought about by using variable speed motors, or having machines running at graded speeds, to which the worn wheels are shifted at given sizes.

The Personal Equation

The next point that requires careful consideration is the personal factor entering into the use of snagging wheels. No two men will get the same life or production from a grinding wheel, even though the work and conditions are identical. If the foundry is large and there is a constant duplication of work so that the piece rate can be used, then it is safe to say that harder wheels must be used than where day rate compensation is in force. However, the ideal condition that permits the wheelmaker to specify a free-cutting wheel, is where there is a premium paid for maximum production with minimum wheel wear.

Some men work the corners of the wheel hard, others are abusive in applying the castings, and still others think they must remove a quarter of an inch of abrasive in dressing, where one-sixteenth inch would be ample. It is, therefore, important that a record should be kept, showing just how each grinder uses his wheels. Many times the grinding wheel manufacturer is blamed for apparent variations in wheel life and hardness, while the true causes can be attributed to the operation of this personal factor. For instance, if a wheel should happen to be on the soft side of grade *S* and it should get into the hands of a grinder who was very hard on grinding wheels, a certain life and production would be obtained. Now, in the same lot of wheels, there might be one that varied slightly the other way or toward the hard side of grade S. Suppose that this was used by a man who was more care-

ful in using his wheel. It is evident the wheel would last much longer under these conditions and hence from a very slight and permissible variation in hardness of wheel, we get a result that would indicate a wide variation, if the personal factor is not considered.

Where there is a constant duplication of work and the piece-rate is used, there is a very simple but serviceable method for computing the relative efficiency of various grinding wheels and operators. The operator's earnings on a given class of work per dollar cost of wheel may be considered, under these circumstances, as a very fair means of determining the efficiency of the particular wheel used. To encourage operators to use their wheels economically, a bonus or premium is sometimes paid for all earnings in excess of a given figure. This works out very satisfactorily and means that the competent grinder is rewarded for his competency. It also invariably means that free-cutting wheels will be used and hence maximum production is obtained.

Records on Snagging Castings

Some actual figures, as follows, obtained from snagging wheels are interesting:

Life, Hr.	Weight of Castings, Lb.	Average Per Hour, Lb.
127	26,543	208
157½	27,043	172

If no records were kept, the wheel with longer life and slightly greater total tonnage, would undoubtedly have been picked as the more economical to use. However, the wheel with 127 hours life produced 20½ per cent more castings a day and the profit on this increased production more than offset the slightly increased abrasive cost.

Another large consumer of snagging wheels keeps a tabular record on printed cards of the following: Date; pieces ground; weight, pounds; hours of grinding; earnings, and wheel loss on diameter. These figures permit the calculation of the abrasive cost per ton of castings ground, and the earnings per ton of castings ground. Manifestly, it is desirable to keep the abrasive cost as low as is consistent with satisfactory earnings per ton. Keeping such records as these makes it easy to pick out the correct grinding wheel, and enables the foundryman to tell just what each of his grinders are doing. He can also tell what the wheel manufacturer is sending him, without guesswork, or resorting to hearsay evidence from a few of the operators.

Here is an example which shows that it is worth while to keep adequate grinding records. A certain large producer of draw-bars was using a hard wheel, 10-*W* alundum. It had fairly long life and turned out a large number of bars before it was used up. On the other hand, the grinders were continually complaining that they had to work too hard and dress too often. Finally the grinding wheelmakers were called into consultation and a test carried out with several different grains and grades of wheel. The result was the choosing of a 10-*U* alundum wheel, one grade softer than the *W*. The complaints ceased as soon as this wheel was put into general use in the foundry, and although the wheels were used up faster, the production was greatly increased and the overhead correspondingly reduced. A brief analysis of this will show up the facts to better advantage:

	Hard Wheel, 10-*W* Alundum	Soft Wheel, 10-*U* Alundum
Grinding cost per ton ground.....	$0.49	$0.55
Total number pieces ground.....	1,800	800
Pieces ground per hour.....	8	10.2

The use of the softer wheel increased grinding cost 12 per cent, but increased production 27 per cent and lowered the overhead charges because of the increased tonnage turned out in the same time with the same equipment.

Make Your Wheels Safe

A discussion of grinding wheel economy would hardly be complete without some mention, at least, of the necessity of making the use of this tool safe. It is not economy to allow the work to get jammed in between the wheel and the rest, because the wheel undoubtedly would be broken. This is prevented by keeping the rests adjusted close up to the face of the wheel. It is not economy to have one or more grinders going to the hospital every little while to have a foreign body removed from the eye. This can be prevented by supplying an approved type of glass goggle, making the men wear them while grinding. Much trouble also has been caused from flying pieces of chilled iron dresser cutters, which break in the dressing operation. This can be eliminated by using hooded dressers. State laws are beginning to call for closer attention to such features.

Apart from the humanitarian side of this question, it is undoubtedly more economical to employ safeguards where rapidly revolving grinding wheels are used than to trust to chance that there will be no accidents. The cleaning of castings is heavy and wearing work at best, and the least that the foundryman can do is to make the working condition as safe and bearable as possible.

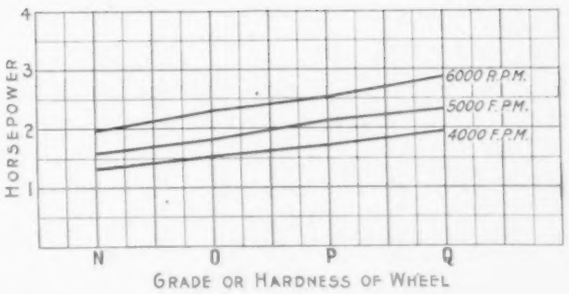


Fig. 5—Relation of Hardness to Power Consumption. Net grinding horse-power per cubic inch of metal removed. Pressure of bar against wheel constant at 46.8 lb. per sq. in.

Cobalt High Speed Steel Not a German Discovery

By the recent decision of a British court, the German patent on cobalt tool steel was revoked. This question has been the subject of much discussion in England in recent years. The original patent was granted to the Stahlwerk Becker of Willich, Krefeld, Germany, and the action was brought by the Dannemora Steel Works of Sheffield, on the ground that the patent was invalid by reason of lack of novelty and prior user. Commenting on the decision, the London *Ironmonger* says:

> The decision of Justice Younger in the patent action, Balfour vs. Becker, not only shows again what has long been evident to those who know the facts, that Germany possesses no monopoly in metallurgical discovery and progress, but also supports the view that in the particular branch of science with which this action was concerned, Britain holds the foremost position in the world. The petitioners for the revocation of the British patent granted in 1912 to the Stahlwerk Becker of Germany for high-speed steel containing an admixture of cobalt, brought into court ample evidence of prior user and won the action on that issue alone. It was not considered necessary to raise the question of utility, although a strong body of evidence bearing upon that issue had been prepared. Unless Justice Younger's decision should be upset, British makers will be free to use cobalt in their high-speed steel mixtures, but an appeal is not regarded as probable. As a matter of fact, British steel manufacturers had so little faith in the validity of the patent that some of them had been making cobalt steel for a considerable time in full reliance upon their legal right to do so. Whatever value there may be in cobalt as an agent for increasing the efficiency of tool steel now becomes the proprty of anyone in this country who cares to avail himself of it. As a whole our steelmakers have been somewhat lukewarm toward the new ingredient on the ground that it makes the steel unduly expensive, but there is a growing volume of opinion in its favor for certain purposes, and many authorities consider that cobalt steel will play an important part in engineering in the future. The evidence in the action showed that long before the German patent was registered at least one Sheffield firm had been experimenting with cobalt steel and had sold it in the market. The appellant in the suit was understood to be acting on behalf of the steel trade as a whole. The Stahlwerk Becker holds patents for cobalt steel in the United States and Germany.

LABOR IN STEEL WORKS

Rapid Increase in Employees from 1915 to 1917—Wages and Hours

The Bureau of Labor Statistics of the U. S. Department of Labor has just published a report (Bulletin 218) which is a continuation of its former reports on wages and hours of labor in the iron and steel industry. This statistical record ends with May, 1915, a time when the late general depression in the industry was lessening, but at a time when hourly earnings still were at a low level. The depression while not affecting the rates of pay which had been materially increased in the spring of 1913, did, by affecting the tonnage output and consequently the incentive for rapid work, so decrease the earnings per hour of tonnage workers, that the combined full time weekly earnings of time and tonnage workers in May, 1915, as compared with May, 1913, were decreased 4 per cent in blast furnaces, 10 per cent in Bessemer plants, 1 per cent in open-hearth plants, 5 per cent in blooming mills, 3 per cent in standard rail mills, 4 per cent in bar mills, and 5 per cent in sheet mills. The weekly earnings in plate mills were unchanged and tin-plate mills showed an increase of 3 per cent.

In addition to the regular tables showing wages and hours of labor a complete presentation is made in this report, by percentages, of the turns worked and the amounts of pay rolls, in the ten departments of the industry discussed, during each month of the two year period ending June, 1915, which covers the greater part of the general depression. These monthly statements clearly show the increasing activity in the several departments from January to June, 1915, while other text and tabular statements exhibit the remarkable increases in employment and in rates of pay and earnings in the iron and steel industry between January, 1915, and January, 1917. In the latter period, approximately 100 of the principal iron and steel plants of the country reported an increase in employees of over 50 per cent and in total pay rolls of over 125 per cent.

The reduction in 7-day work through the introduction of relief gangs which began in 1910 increased to such an extent that in blast furnace plants, in which operations are continuous, only 59 per cent of the employees worked seven days per week in 1915, as compared with 80 per cent in 1913, 95 per cent in 1910, and 97 per cent in 1907.

The wide range of average full-time weekly earnings in the iron and steel industry is shown by the following list, including a few of the unskilled, semi-skilled, and skilled occupations for 1915, selected from the various departments:

Blast furnaces:		Plate mills:	
Laborers	$12.20	Shearmen's helpers	$17.89
Keepers	18.33	Table operators, sheared	22.63
Blowers	26.93	Screwmen, sheared	32.61
Bessemer converters:		Bar mills:	
Mold cappers	$17.53	Bundlers	$13.38
Steel pourers	27.96	Roughers	25.76
Vesselmen	30.87	Rollers	56.75
Sheet mills:		Standard rail mills:	
Openers	$11.93	Hot bed men	$12.54
Doublers	19.42	Table lever men	22.92
Sheet heaters	37.19	Rollers	43.09
Open-hearth furnaces:		Puddling mills:	
Stockers	$15.41	Bloom boys	$10.62
Stopper setters	21.96	Puddlers	20.45
Melters' helpers, first	32.80	Heaters	36.37
Blooming mills:		Tin plate mills:	
Bottom makers' helpers	$12.46	Screw boys	$16.59
Manipulators	25.81	Catchers	20.87
Heaters	40.06	Shearmen	29.55

A similarity in earnings by no means indicates a similarity in full-time weekly hours; for example, it will be noticed that the full-time weekly earnings of blast furnace keepers were only $1.09 less than those for sheet mill doublers, but the working time differed greatly in the two occupations, the average full-time hours per week of keepers being 79.4, while that of doublers was only 42.8.

The rate of wages paid common laborers is to a large extent a basic rate from which are determined the rates for other occupations requiring little skill, hence the rate for common labor is of importance beyond the limits of the occupation proper. The rate per hour is practically the same in all departments of a plant, but the earnings per day or week, of course, are determined by the number of hours worked. The average rate per hour of laborers in 1915 in the ten departments covered by this report was 18 cents while the average full-time hours per week ranged from 57.5 to 74.3, and the average full-time weekly earnings from $9.66 to $14.31.

A valuable addition to this report is a glossary of iron and steel occupational terms, covering not only the principal occupations but many of the minor ones as well.

Huge Metal-Planing Machines of Concrete

Two gigantic metal planing machines, the principal parts of which will be of monolithic reinforced-concrete construction, this including the beds, housing and platens, with cast iron for bearing surfaces, are being built under a large tent by the Amalgamated Machinery Corporation, Chicago. A steam shovel began excavating for the foundations for the machines Dec. 24, and it is expected they will be completed and running by Feb. 10. The mission of the machines is the planing of beds for long gun-boring machines. A complete description of the machines and of the many ingenious and scientific devices used in their construction and the alignment of parts cannot be given at this time, but will soon be available. Photographs of progress on the machines are made daily.

The concrete beds of the planers are 184 ft. in length, and the platens 90 ft. long and 13 in. thick. The width between housings is 72 in. and the cross-rail, which is stationary and faced with cast iron, is 4 ft. square. They will plane from 36 in. down to 20 in.

The cast-iron ways will be attached to the concrete bed in sections 12 ft. long, and will be flat on one side and V-shaped on the other. The approximate alignment of these pieces will be attained by hydrostatic means, and surveying instruments and other devices, some utilizing the reflection of light rays, will be employed to obtain absolute precision. It is stated that the curvature of the earth to the degree of 12/1000 in. must be rectified, while allowances must be made for contraction and expansion due to changes of atmosphere, and the varying expansion of concrete and iron. The machines are the conception of Lucien I. Yeomans, who recently received the medal of the Franklin Institute, Philadelphia, for his contribution to science in designing a shell-making machine, which was not only constructed in a short space of time, but when completed was most efficient.

The presidency of the Amalgamated Machinery Corporation has been accepted by T. K. Webster, Charles Spalding has been appointed general manager of sales of the corporation. For the past 12 years he has been connected with the sales department of the Gisholt Machine Co.

The Hanyang Steel Plant in 1916

The steel output of the Hanyang Iron & Steel Works in China in 1916 was as follows, according to U. S. Consul General Edwin S. Cunningham of Hankow: Rail steel, 9535 tons; mild steel, 33,568 tons. It is stated that the price of pig iron rose 100 per cent from the first part of 1916 to the end of April, but later in the year it dropped 30 per cent. Structural steel rose in the same period approximately 60 per cent but dropped 20 per cent after July. There were no additions to the Hanyang steel plants nor to the new plant at Tayeh. Delay in the anticipated blast furnace development at Tayeh was due to the failure of American and English manufacturers to forward the needed machinery. Salaries of the steel plant staff of 276 and of 2000 workmen and 2500 laborers were raised 5 per cent in 1916.

BLAST PREHEATER FOR STOVES

Marshall Process of Heating Blown Air to Improve Blast Furnace Economy

BY W. S. RAUDENBUSH*

A PATENT has been granted E. E. Marshall, president American Manganese Mfg. Co., also independent operator of the Juniata Furnace & Foundry Co., Newport, Pa., and the Lochiel Furnace, Harrisburg, Pa. The principle of this patented process is to take the air coming from the blast engines and pass it through a preheating device prior to its admission to the standard fire brick stoves and from there to the blast furnace. The advantages to be gained by this method of treating the blast for the furnace is to create a more even temperature in the blast going to the furnace, thereby decreasing the fuel consumption, increasing the tonnage, as the furnace drives more uniformly, and also reducing the number of hot blast stoves required for operation.

The construction of the preheater is the same as that of the old iron pipe stove that was used in blast furnace practice prior to the invention of the modern fire brick stove, consisting of a combustion chamber, a pipe chamber and a draft stack chamber. The gas and blast are admitted at the same end of the preheater or, in other words, in parallel. This is done to keep the first row of pipes cool by the incoming blast and to prevent the gas flame from warping and burning them out. The cold blast line from the engines is blanked by means of a valve, and the cold blast to the preheater is taken from the cold blast line on the engine side of the blank or valve. The blast then passes through the preheater and is admitted to the blast main on the stove side of the blank or valve and into the fire brick stoves through the cold blast valve on these stoves.

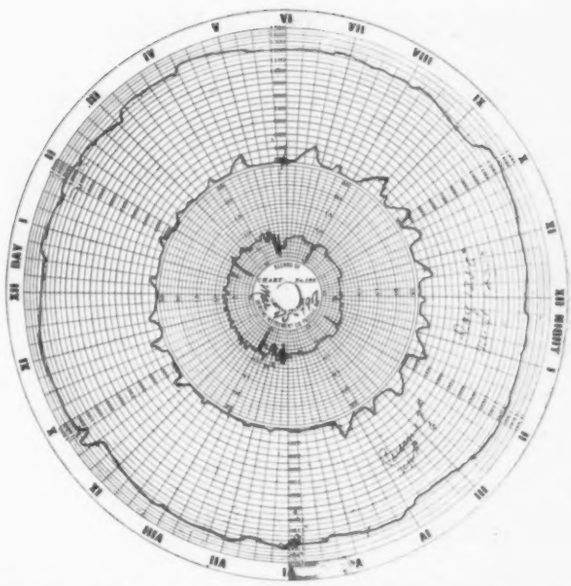
The blast is heated to any predetermined temperature in the preheater up to 900 deg. Fahr., which is the maximum for safety to the pipes, before admission to the fire brick stoves where it is finally raised to the required temperature for use in the furnace.

Functions of Preheater

The action of the preheater on the stoves is as follows: The fire brick stoves coming off of gas are put on the furnace and the preheated blast is admitted through the cold blast valve on the stoves. As the preheated blast has attained a rather high temperature in transit through the preheater, the heating surface of the stoves is not cooled off so fast as it would be if a cold blast direct from the blast engines were being admitted to this same heating surface. Therefore the reduction in the stove temperatures during the period the stoves are on the furnace is not so great with the preheater attachment as without it and consequently the blast has a more uniform temperature with only a slight variation from the time the stoves are put on the furnace until they are taken off. Because of this small variation in the blast temperature the fuel is reduced per ton of metal produced and the tonnage increased, as the furnace drives more regularly, due to the fact that the temperature is more uniform. Another condition that has been found to exist with the preheater connection on the stoves is that dirt does not accumulate in the checkers in the stoves as it does without this attachment. At Newport after a six-month run on ferromanganese the stoves were opened up and the checkers found to be as clean as when the furnace started up.

At Newport and Lochiel there are only two stoves at each plant, the Newport plant being equipped with modern Roberts stoves and the Lochiel plant with two old Whitwell stoves, which prior to the preheater installation could not show over 1050 deg. temperature. These same two stoves on a ferromanganese furnace have been averaging 1450 to 1400 deg. constantly and there have been occasions where repairs on one of the stoves have necessitated the operation of one stove alone and the preheater for 20 hr. with a loss of only 350 deg. in the blast temperature.

*Engineer, American Manganese Mfg. Co., the Juniata Furnace & Foundry Co. and E. E. Marshall, Lochiel Furnace, Harrisburg, Pa.



The stove changes covered by this blast furnace pyrometer chart were made on an average of every 3 hr. The blast temperature variation is put at 100 deg. The average day time temperature is 1256 deg. and that of the 12 hr. of night, 1206 deg. The chart was picked at random from a few months' accumulation

In conclusion the writer would like to state that the cost of the preheater installation is only about one-third of that of a fire brick stove, and on a plant where there are three or four stoves such an installation would allow one or two stoves off continually for repairs without reducing the output of the plant or increasing the cost of production, and furthermore on a plant such as at Newport or Lochiel it would have been impossible to manufacture ferromanganese on a profitable basis without adding more fire brick stoves.

Domestic Magnesite in 1917

According to estimates by C. G. Yale, of the U. S. Geological Survey, the production of magnesite in California in 1917 exceeded that of all former years, being estimated at 215,000 tons. This quantity and the magnesite produced in the recently discovered field in Stevens County, Wash., estimated by R. W. Stone, of the Survey, at close to 100,000 tons, makes an output of about 315,000 tons in 1917, or 15,000 tons more than the normal domestic demand. In view of the great increase in production made in California and of the fact that some of the large properties in Washington were only partly developed at the close of 1917, it is believed that the domestic industry hereafter will be able not only to supply the home demand but may be able to produce a surplus for the Allies.

Until 1915 the United States produced only about 10,000 tons of magnesite annually, although it used 300,000 tons. The domestic supply came from California and the imported material came from Austria, Hungary, and Greece. In 1916 the production in California jumped to 150,000 tons, but the imports, if the calcined material is computed as crude rock, fell to 93,000 tons. The supply therefore fell short of the demand. Manufacturers of open-hearth steel had difficulty in getting enough magnesite brick to line their furnaces, and companies that made magnesite flooring were short of raw material.

At a meeting of portable electric tool manufacturers at Indianapolis, Jan. 12, the following officers were elected: President, Walter Friedlander, Cincinnati; vice-president, F. Schneider, Cleveland; secretary, R. S. Cooper, Chicago; treasurer, James Clark, Jr., Louisville. The newly organized association will be known as the Portable Electric Tool Association. The association sent a telegram to President Wilson tendering to the Government the services of the manufacturing facilities of its members in the production of portable electric tools on an emergency basis as an aid to the successful prosecution of the war.

HOUSING BILL PASSED

Senate Approves Measure to Authorize Expenditure of $50,000,000

WASHINGTON, Jan. 29.—The sum of $50,000,000 is appropriated in a bill which passed the Senate on Jan. 18 for the housing of employees of shipyards, both private and Government-owned, having contracts for the construction of vessels for the Emergency Fleet Corporation. This measure, which marks an innovation in federal legislation, will undoubtedly be approved by the House in the course of a few days. Already, however, it is predicted that the measure will be supplemented by others providing housing for the employees of munition plants and that before this work is completed the public expenditure on this account will exceed $100,000,000.

The bill passed by the Senate was drafted by the United States Shipping Board and was promptly reported by the Committee on Commerce pursuant to a request from Chairman Hurley for the earliest possible action. As finally approved by the Committee, the bill authorizes the Shipping Board "(a) to purchase, lease, requisition, or acquire by condemnation or otherwise any improved or unimproved land suitable for the construction thereon of houses for the use of employees of shipyards in which there are now being constructed ships for the United States; (b) to construct on such land houses and all other necessary or convenient facilities, upon such conditions and at such price as may be determined, and to sell, lease, or exchange such houses, land and facilities upon such terms and conditions as it may determine, and, (c) to purchase, lease, requisition, or acquire by condemnation or otherwise any houses or other buildings, together with the land on which the same are erected, and all necessary and proper fixtures and furnishings therefor; to manage, repair, sell, lease, or exchange such lands, houses, buildings, fixtures and furnishings upon such terms and conditions as it may determine."

Senator Wadsworth's Speech

When this bill was brought up in the Senate for consideration Senator Wadsworth, of New York, while indorsing the general purpose of the measure, drew attention to the fact that it represented a "piecemeal attempt to solve a great problem now confronting the country" in connection with the prosecution of the war. "This legislation," said he, "places upon the Emergency Fleet Corporation the building of facilities for housing of workmen. That is one agency of the Government which is to be clothed with that power. In my humble judgment, it will not be the only agency that will have to have the same power. Before we get through, we will have to view this housing problem as it applies to the men and women who work in munition factories and we will have to supply housing facilities, especially, for a largely increased number of workmen in the neighborhood of the great steel mills engaged in the manufacture of ordnance, cannon, munition, rifles, and various kinds of supplies for the Army and Navy.

"I cannot let this opportunity go by without pointing out the essential weakness of our war-making machinery, lack of co-ordination and centralization. This is a perfect example of it and it must be cured sooner or later by the centralizing of these activities under one control as it has been done in England and in France. As an illustration, the Government is about to build an enormous powder manufacturing plant in the State of West Virginia and another in the State of Tennessee. They are to be brand new plants, with a capacity of hundreds of thousands of pounds of powder per day. Without question, the housing problem will have to be met in that connection. Now, are we going to leave that problem to the War Department and another similar one to the Shipping Board?

"In this connection, I want to remind the Senate that the Committee on Military Affairs has reported a bill creating the office of Director of Munitions under whose jurisdiction and control the President may, in his discretion, place all problems of this sort, involving not only the production and procurement of materials used in the war, but also the housing problem, under the language of the bill. The pending measure, therefore, is only a first step, and sooner or later we shall have to take away the housing problem from the Emergency Fleet Corporation and place it under a central control, because a housing problem in one line of industry is not essentially different from the same question in another line of industry. We have scattered our authority and our power to half a dozen Governmental agencies and it is that very failure of ours to concentrate authority and to have planned things months in advance that has created the condition that confronts us to-day, of which the coal situation is typical."

Other Senators supported Senator Wadsworth's view, but because of the serious emergency now confronting the Shipping Board in the matter of providing habitations for many thousand workmen, the Senate passed the bill in the form as reported.

Why Water Power Developments are Backward

Why water power developments have been relatively backward was discussed in a paper on "Hydro-Electric Development" presented on the special invitation of the water power committee of the United States Chamber of Commerce on Jan. 14, by Calvert Townley, Westinghouse Electric & Mfg. Co., New York. As author, he spoke for the Engineering Council, the general engineering organization designed to allow for utterances on underlying principles and economic facts indorsed by engineers and beyond the field of controversy. He emphasized that the benefit afforded communities by serving them with cheap power and to the nation by the conservation of coal is far more valuable than is the exact solution of the question of restricting the returns to capital to their irreducible minimum. "The present emergency, due to the progress of the war," he said, "has forcibly illustrated the importance of having developed the greatest possible number of water powers as a source of industrial power supply."

There are in service four to five times as many steam as water horse-power and there are still undeveloped water horse-power equal to at least twice that of all the steam capacity in service. Some of the undeveloped power sites are too remote from any market to be now utilized, and an uncertain number are not commercial prospects; but even so, he emphasized, it is clear that the possibilities of additional development are very great.

It has been estimated that in 1911 there were over 26,000,000 steam engine horse-power capacity in use (including railroad locomotives) in the United States. The aggregate water horse-power developed and undeveloped has been computed as around 60,000,000. Of this latter the U. S. Census of 1912 gives 4,870,000 as developed and in a report of January, 1916, the Secretary of Agriculture put the total at 6,500,000. Of the estimated 55,000,000 undeveloped water horse-power in the entire country, approximately 40,000,000 is located within the boundaries of the thirteen so-called western water power states.

"In these same states the Federal Government still retains as proprietor 76,000,000 acres, or over two-thirds of the aggregate acreage of all these states taken together."

The cost of a steam-electric plant per unit of capacity just before the war was about one-third what it was fifteen years previous, while the energy it produces per pound of coal has increased fifty per cent. In addition, the Diesel or the internal combustion engine is now coming largely into use as a further competitor of water power. Mr. Townley combated particularly the widely held but mistaken view that any water-driven plant will produce power at lower cost than steam and emphasized that, to prevail, the hydro-electric power must be materially lower than steam power in cost.

Pig-iron imports into Switzerland for the first half of 1917 are given as 50,898 tons as compared with 73,092 tons to July 1, 1916, and 70,068 tons to July 1, 1915.

New Storage Battery Truck and Tractor

As an addition to its line of electric storage battery industrial trucks, the Elwell Parker Electric Co., Cleveland, has recently brought out a new type of crane truck and also a new tractor. The crane truck, designed for warehouse or factory use, is provided with a revolving jib crane with a capacity of 1000 lb. at a maximum outreach of 48 in. The crane is operated by a separate motor, receiving electricity from the same battery that furnishes power to the propelling motor. The motor and hoist mechanism counterbalance the load on the hook. The jib swings to the right or left 90 deg. on either side, and the load can be picked up and either deposited on the truck platform or on a truck or trailer placed alongside.

The crane adds materially to the flexibility of the truck in various ways. With it trays of material may be stacked, saving the space that is taken on the shop floor in depositing these side by side. A load of trays may be set alongside of machines and again picked up when operations are completed; trays of material can be dumped directly into picking vats, and the crane may be found handy to use in place of a portable shop crane.

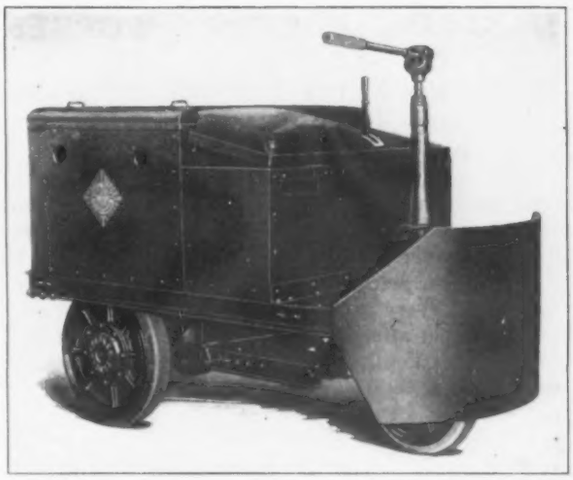
The truck can also be used as a tractor and has large-diameter wheels, so that it is applicable for yard work or when runways are not smooth. The truck is 40 in. wide and 123 in. long, its platform being unusually long. Its speed is from 350 to 600 ft. per min., and the speed of the hoist is 20 ft. per min. A limit switch stops the motor on the upper travel of the load. The driving wheels are 21½ in. and the rear wheels, 15 in. in diameter. Both sets have solid rubber tires and all of the wheels are demountable. The truck is steered by the four wheels.

The tractor is built for medium service, occupying a position about half way between an ordinary electric truck and a heavy-duty tractor. One of the most distinctive features of this tractor is that it has a single front wheel. It is steered by a handwheel or a hinged right and left lever. When the wheel steer is used the control lever is located on the left of the column. When the lever steer is used a control lever is provided at the side of the operator's seat as shown. The steering wheel is carried on roller bearings in a heavy steel fork, turning on large ball bearings in the steering column base. The seat operates as a circuit breaker, which closes when the operator's weight presses the spring, but only when the controller is in off position.

The tractor has solid wheels and solid rubber tires. The normal drawbar pull is 300 lb. and 850 lb. maximum. The speed with no load is 625 ft. per min. Its length is 70 in. and its width 41 in. The inside turning radius is only 7 in., and the outside turning radius 64 in., or less than the length of the tractor.

Both the truck and tractor have a single reduction worm drive, the worm being steel and the worm gear phosphor bronze. The motor is direct connected to the worm on a full floating axle. The truck has a foot operated brake, and the tractor a pedal with a heel latch. Both machines have three speeds in either direction. Each is equipped with an Elwell-Parker heavy-duty motor and an Edison or a lead battery.

A Revolving Jib Crane with a Reach of 48 In. Enables Loads of 1000 Lb. or Less to be Handled by a New Storage Battery Truck



A Tractor with a Single Front Wheel has been Developed for the Middle Ground between a Standard Storage Battery Factory Truck and a Heavy-Duty Tractor

Labor Turnover and the Disabled Workman

What to do when a workman has been injured, in order to reduce labor turnover to a minimum, was discussed by Earl B. Morgan, safety engineer of the Norton Co., manufacturer of grinding wheels, Worcester, Mass., before the National Safety Congress at its last meeting. He urged close co-operation of the plant physician, the safety engineer and the employment manager, whereby the disposition of any injured employee's case is known at all times, and no delay or mistake is made in placing him back on a wage-earning basis at the earliest moment consistent with quick recovery.

The physician's diagnosis and recommendation are taken as a guide as to whether a man may be returned immediately to his job, or in order to expedite recovery must be prohibited from working while convalescent, or whether after a short wait he may be placed on other more suitable work. Except for the malingerer, he stated that no difficulty is encountered in rating an injured man as to his future ability to earn a living. He urged that plans, based on the experience of safety engineering staffs of large industrial organizations in this country, be formulated to deal with the approaching problem of the employment of disabled soldiers and sailors.

A report on the results of the tests carried out at Hartlepool, England, by the Committee of Research recently appointed by the North-East Coast Institution of Engineers and Shipbuilders, England, has been issued and presents data pertaining to the production of high vacuums for steam turbines and to more economical production of low vacuums for cargo vessels. It refers to the tests as demonstrating that a steam jet or a series of steam jets, when used in combination with reciprocating air pumps such as are generally used in the condenser plant of marine engines, effects economy. For a given duty it states that the use of a steam jet may allow the speed of a given pump to be reduced from 60 strokes per minute to 20 and that the consumption of steam may be reduced by one-third.

J. G. Carroll, referee in bankruptcy for J. V. Thompson, former banker and coal operator, following a meeting of creditors, has issued an order for the sale of 12,000 acres of coal lands to the H. C. Frick Coke Co. interests for $500 per acre, or $6,000,000 in all. Some objections against the sale filed by creditors were overruled by the referee, who said he was anxious to have the sale confirmed as soon as possible to cut down the expenses, which are piling up daily.

HANDLING FOUNDRY WORKERS

Proper Supervision and Discipline—Shop Manners—The Worthless Employee

BY PAUL R. RAMP*

TO the younger generation, seeking to become efficient foundry foremen or superintendents, the following suggestions are offered as fundamental to success. In order to be a profit to his employers, a foreman must know what every man under him is working on, otherwise he is not attending to business or is negligent. If he claims he does not have time to see the work each man is doing, the job is too big for him.

Supervision and Discipline

It is not how much he knows about foundry work, but rather how much he teaches his men about it that counts.

The foreman and the superintendent are not making molds or cores, chipping castings or shipping them; the men do that work and should do it according to instructions.

The successful foreman is able to intelligently and fearlessly tell his men what to do and how to do it, regardless of their age, length of service, reputation as competent workmen, or the number of times he has told them the same thing before.

Let him make up his mind how he wants a job done, be satisfied he is right, then go to his man and make him do it that way.

An Incompetent Workman

At one time the writer had charge of a foundry where the methods of working were about 50 years behind the times. The coreroom was in bad shape. He put a man in there that had worked for him for a good many years, and had worked in the right way.

He knew this man would try and get the force working according to more modern methods. After the fellow had been on the job several months he stopped him one day and called his attention to some work that was being done in the same old way.

He said: "Henry, you know that is not right. You never did the job that way in Burlington."

"No," he replied, "but that is the way they do it here."

Now, that was a case of the foreman letting the job drive him. His experience was of no value to his employer because he did not use it. He lacked the courage to teach his men and to insist upon them working his way. Needless to say, he was a failure on the job.

Manual Labor Not a Foreman's Job

It is foolish and expensive for a foreman to work with his hands unless he has only two or three men. He is not paid for what he does—rather for what he gets others to do, and he cannot watch his men if he has his head down in a sand pit or a mold.

When a foreman goes to work at manual labor the help loaf. An instance is recalled where the foreman was down in a pit digging for dear life, while the men stood by watching him.

Shop Manners

The foreman must be more of a gentleman than his men, or at least as much of one, if he expects them to have any respect for him. He should avoid talking to one man about another. The other fellow may hear of it, and it is a sure thing that the foreman will lose the loyalty of the man who is talked about.

By a careful study of human nature the foreman or superintendent can make the men realize that they can "make a hit" easier by turning out good work at a profit than by telling a funny story.

It never pays to be overbearing. It is just as easy to say, "John, I wish you would do this for me," as to say, "you have got to do this," unless the workman has had previous instructions and has not heeded them. John knows he will have to follow orders, and it is better to start him out feeling good, because the secret of successful organization is in getting men to want to do things. When a man works hard because he wants to expedite the work, he gives the very best there is in him. When a man works hard because he is afraid of the man over him or afraid of losing his job, he is going to do not what he is capable of doing, but just what he is forced to do. Such a man requires continual watching and driving, and as a rule his work is never above the average.

The more conceited a foreman becomes the more he will have to drive his men, and the less leading he can do.

Weeding Out the Unsatisfactory Worker

Nine out of every ten men want to do right. Study how to handle them. Every fellow has a soft spot somewhere. Find it. Then make profits out of it. The tenth fellow, who is found in every shop, will have to be discharged, after everything that can be done to get his heart in the right place has failed.

Always remember, however, that it takes a better foreman to make a good workman out of a poor or a mean one than it does to fire him.

While it is best always to appeal first to the good in a man, the old saying, "You can catch more flies with molasses than you can with vinegar" falls down in this line of work. The fellow that works entirely after this rule finds himself using nothing but molasses and getting very poor results.

You can be a gentleman, but you can not be a "good fellow" and also a good foreman.

Overlooking Cause of Failure or Carelessness

Never neglect to tell a man about a defect in his work, no matter how small it may be. The foreman sometimes thinks, "Oh, well! That is a small thing, and he has been doing good work for some time, I wont nag him." This is a mistake. The small error is an indication that he is getting careless, and if not cured right away the company inevitably suffers greater loss.

No foreman can establish a record or make profits for his company if he neglects to look over all of his work every day. He is missing the most important part of the work that helps to make him and his department more valuable. When a foreman does not look carefully for his failures he is neglecting invaluable object lessons.

When he sees one of the men doing his work the wrong way he should not say to him "You had better not do that. The president or the superintendent might come along and see you, and he would be wild about it." He should tell the man that he does not want him to do that again. When the foreman tries to slide it off on the man higher up he makes the man think it would be all right so far as he is concerned if it was not for the "boss" objecting. Consequently, the workman gets so he does not think it necessary to do right, except when the president or general manager is around.

When a man does a big day's work a foreman should never forget him, no matter if he does not like the fellow personally. He should never let that fact keep him from taking care of the man for he is the most valuable type of man to have on the floor.

In the foundry to-day there are so many things that must be left to the individual ability of the molder, the machine operator and the pattern maker, and to their

*Foundry superintendent, Moline Plow Co., Moline, Ill.

desire to do their very best, that when the men in charge attempt to get out of them a good volume of production it must be carefully determined that the best methods are being employed to bring about that result.

Japan Plans to Do Without American Plates

The December issue of *Eastern Commerce*, a monthly review published in Yokohama, Japan, says that every effort is being made by the Japanese authorities to make Japan self-supporting in the matter of iron and steel. The Minister of Agriculture and Commerce is quoted as saying:

Since the government decided to break off negotiations with the United States over the iron and steel question, the authorities have been considering ways and means of placing this country on a self-supporting basis for supplies of these metals. To begin with they have decided to meet the immediate and indispensable demand for shipbuilding materials from the state steel-works at Wakamatsu, for which the necessary arrangements and operations have already been set in motion. The proposal is not to supply the shipbuilders at the expense of the naval and railroad services, as is rumored, but to carry out an extension of the operations of the steel works so as to turn out shipbuilding materials without in any way interfering with the requirements of the government services. It is true that the steel works has already been operating up to its utmost capacity, and no great quantity beyond the limit can be produced without setting up new equipment, which means some considerable time before extra operations are possible. But on close examination the immediate and indispensable demands for shipbuilding purposes have proved unexpectedly small. It has been found that 7000 tons are needed for vessels whose keels have just been laid down, and 11,000 tons more for vessels already building. Of these requirements only 1000 tons represents the quantity immediately necessary. This the authorities have decided to supply, while the other requirements will be satisfied by and by. Next year the output of the state steel works is to be increased by 102,000 tons, and it is hoped that this will meet the greater portion of the shipbuilding requirements.

Some Japanese merchants are of opinion that as the suspension of iron and steel exports from the United States to Japan entails considerable loss to the American merchants concerned, the latter will eventually succeed in inducing their government to modify the embargo in favor of Japan.

Spelter Output in 1917

The production of spelter from domestic ore in 1917 is estimated by the U. S. Geological Survey at 574,994 net tons and the production from foreign ore at 92,757 tons, a total of 667,751 tons, compared with a total of 667,566 tons in 1916 (563,561 tons of domestic and 104,005 tons of foreign origin). This indicates practically the same production as in 1916, but a loss of more than $60,000,000 in value. Included is 28,175 tons of electrolytic spelter, of which a part was refined by electrolysis from prime western spelter. This was the product of five plants. The quantity of zinc dust prepared for market was over 7000 tons. The output of secondary spelter redistilled at regular smelters and at the spelters with large retorts was about 21,600 tons. Oklahoma leads the States in output, with 198,519 tons; Illinois is second and Kansas third.

The exports of spelter made from both foreign and domestic ores, to Nov. 1, 1917, had been 184,498 tons as compared with 206,367 tons in all of 1916.

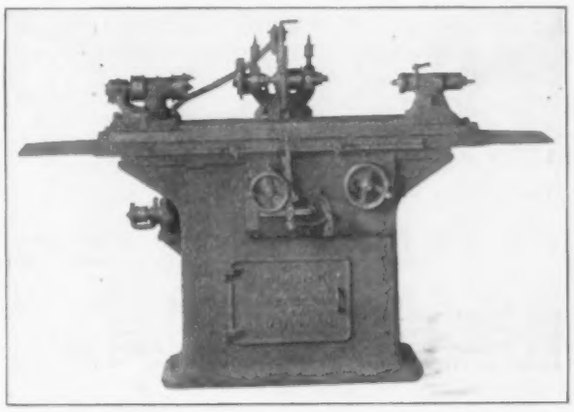
The apparent domestic consumption in 1917 is put at 431,500 tons, as compared with 458,428 tons in 1916. This decrease is partly accounted for by the increase of 15,000 tons in the zinc content of brass exports. The normal ante-war consumption of spelter in the United States was about 300,000 tons per year.

The Edison Electric Appliance Co., Inc., a new corporation, has taken over the entire business of the Hot Point Electric Heating Co., the Hughes Electric Heating Co, and the household heating device business of the General Electric Co.

Universal Cylindrical Grinding Machine

A grinding machine, capable of handling work up to 10 in. in diameter and 30 in. long, has been brought out by the Webster & Perks Tool Co., Springfield, Ohio. It is of the universal cylindrical type and is said to combine the accuracy required for toolroom work with the rigidity essential to the production of high-grade parts in quantities. The table drive and the automatic cross feed mechanism are assembled as a single unit, which can be removed from the machine in a single operation. A movable cam roller provides automatic cross feed at either or both ends of the table travel, a knurled adjusting nut enabling variations of from 0.00025 to 0.004 in. to be obtained readily.

Large cap screws secure the bed to the base, which is of heavy construction, with three planed bearing pads on the bottom. The sliding table has automatic control of travel by adjustable dogs secured to the edge of the table, with an adjusting screw and lock nut for fine adjustments. Two rates of table travel are provided by a lever in front of the machine and in conjunction with a four-step cone pulley on the countershaft gives eight different rates of travel, a sufficient rest interval being provided at the end of the stroke



Automatic Cross Feed Ranging from 0.00025 to 0.004 In. Is Provided at Each End of the Table Travel in a New Universal Cylindrical Grinding Machine

to permit the wheel to free itself. The swivel table rests on large pads on the sliding table and has an adjusting screw at one end to enable it to be swiveled in either direction.

The bases of the head and footstocks are heavy and are clamped to the swivel table by bolts fitting in a T-slot in the table. They are both aligned against the front edge of the swivel table. The spindle is of hardened and ground tool steel and is mounted in a special form of alloy bronze bearing with provision to compensate for wear.

The control of the table may be changed from hand to power by simply pushing in the knob in the center of the handwheel. The handwheel is thus rendered inoperative and when it is desired to return to hand control the table control lever is placed in the neutral position and the knob pulled out.

To secure references showing the extent of manufacturing industries of Pennsylvania since 1914, the Pennsylvania Manufacturers' Association has undertaken at its own expense to compile a census county by county. The Employers' Association of Pittsburgh, Oliver Building, Pittsburgh, is taking care of Allegheny County. It has mailed a questionnaire on apprenticeship matters and also a card which it is desirous of sending to all companies concerned to cover such confidential information as the number of employees, amounts of payrolls and value of product.

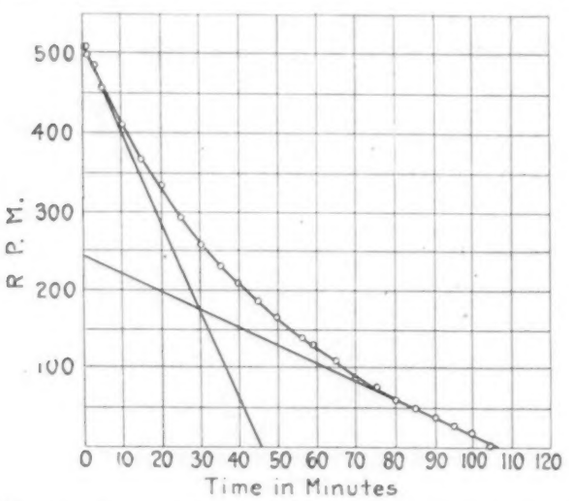
The Ohio Iron & Metal Co., Chicago, has opened a department, in charge of H. L. Beach, for the handling of relaying rails and second-hand railroad equipment.

Flywheel Design for Rolling Mills*

Selection and Use of Characteristic Load Curves—Test for Friction and Windage Losses a Check on Calculations

BY G. E. STOLTZ

FRICTION losses of a flywheel are due to bearing friction and windage. The windage of slow speed wheels is not of great importance, but on the higher speed wheels it is by far the greater factor. The large flywheel motor-generator sets used for reversing mills or hoists are usually built with a sheet metal cover over the flywheel as a protective device. This also reduces the windage losses. Some conception of the magnitude of these losses can be obtained by noting the temperature rise of the sheet-metal cover. This heat is generated from the eddy currents and surface friction of the air between the flywheel and its cover.



Rundown Curve of Flywheel Set Showing Decrease in Windage Friction as Speed Decreases. The slope of the line tangent at 515 r.p.m. is proportional to the combined windage and friction torques, while that of the line tangent at 60 r.p.m. is proportional to the friction torque alone, windage having become negligible

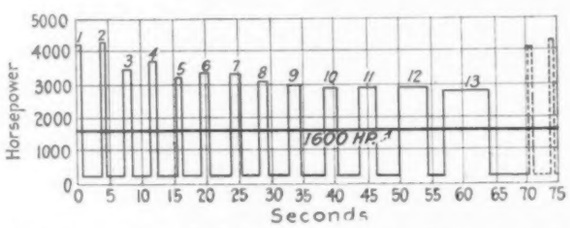
A run-down curve was taken of a flywheel set operating at 515 r.p.m. The weight of the plate wheel was 100,000 lb. and its diameter 12 ft. The power input of the driving motor was read immediately before the set was shut down, and as the breaker was opened readings were begun to obtain the speed of the set at intervals of time while the wheel was coming to rest. From the data so obtained the reproduced curve was plotted.

After subtracting the losses in the driving motor it was found that the friction load was 126 hp. This is composed of bearing friction and windage of the wheel. The windage of a wheel varies as the square of its velocity, while the torque due to bearing friction is approximately constant as long as the oil film is not broken. Therefore, the main loss on a slow speed wheel is bearing friction and the run down curve on such a wheel would be practically a straight line.

Segregation of Windage and Bearing Losses

Drawing a straight line tangent to the curve at 515 r.p.m., we find that the set would come to rest in 46 min. if the torque, due to windage, did not decrease with the speed. During the time which elapsed between the eightieth and one hundredth minute, it will be noted that the curve is practically a straight line, indicating that after the set had reached a speed of 60 r.p.m. the windage became negligible. Drawing a straight line tangent to this portion of the curve, we find the set would come to rest from 240 r.p.m. in 107 min., if bearing friction were the only retarding force. Since the slope of these two lines is proportional to the friction torque, and that of the first line, which is drawn from a point representing 515 r.p.m. on the vertical scale to a point representing 46 min. on the horizontal scale, is due to the combination of windage and friction, while that of the other line is due entirely to bearing friction, it is possible to segregate these losses. The slope of the tangent 515 to 46 is proportional to the total friction of 126 hp., which is obtained at 515 r.p.m. This may be represented by the ratio of the ordinate divided by the abscissa: $515 \div 46 = 11.2$. The slope of the tangent 240 to 107 is proportional to the bearing friction: $240 \div 107 = 2.24$. The bearing friction is, therefore, $126 \times 2.24 \div 11.2 = 25.2$ hp.

Eighteen-inch bearings were used on this set, which gives a bearing velocity of 2420 ft. per min. Usually the variation of the coefficient of friction, due to change in speed, is negligible, but as this is a high-speed bearing, we would estimate the friction at 515 r.p.m. to be 20 per cent less. The bearing friction at 515 r.p.m. would then be $25.2 \times 0.80 = 20.2$ hp., and the windage at 515 r.p.m. would be $126 - 20 = 106$ hp. The correction for a variation of bearing coefficient of friction need not be considered on the slower speed wheels, particularly where the journal speed does not exceed 1500 ft. per min. It will be noted that the curve drops abruptly from the 103d to the 105th minute. This is the point at which the journal loses its oil film and the coefficient of friction is greatly increased.



Estimated Mill Load of Blooming Mill for Purposes of Design. Peaks above 1600 hp. are to be taken by the flywheel

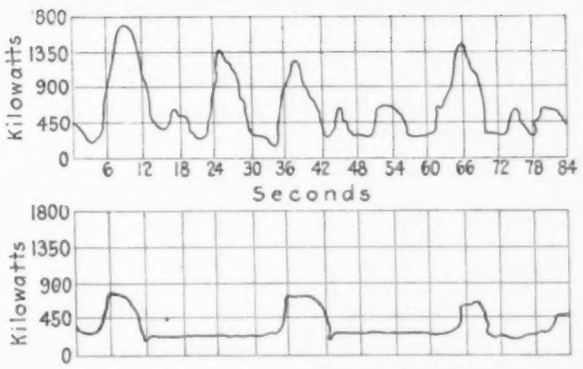
Flywheel Loads from Curve

Pass	Flywheel Load During Pass Hp.-Sec.	Accumulated Flywheel Debit at End of Pass Hp.-Sec.	Restored During Interval Hp.-Sec.	Flywheel Debit at End of Interval Hp.-Sec.
1	1,670	2,370	2,370	....
2	2,050	2,050	2,050	....
3	1,620	1,620	1,620	....
4	1,940	1,940	1,940	....
5	1,800	1,800	1,800	....
6	2,180	2,180	2,180	....
7	2,450	2,450	2,450	....
8	2,520	2,520	2,520	....
9	2,870	2,870	2,870	....
10	3,110	3,110	3,110	....
11	4,570	4,570	4,200	370
12	5,780	6,150	4,200	1,950
13	7,150	9,100	8,400	700

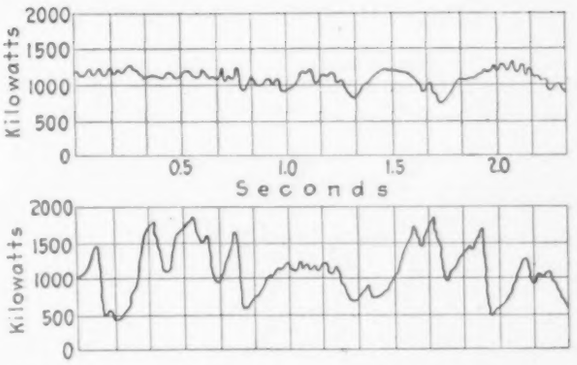
From the curve it is also possible to check calculated figures of the energy in the rotating parts. At 515 r.p.m. we found the flywheel friction and windage to be 126 hp. If this friction torque were maintained, the set would come to rest in 46 min. Since the average speed of the set during this period is one-half of the initial speed, the average horsepower developed between 515 r.p.m. and rest would be 63, therefore, the total flywheel effect at 515 r.p.m. would be: $63 \times 46 \times 60 =$ 174,000 hp. sec. This energy varies as the square of the speed. At one-half this speed the energy in the wheel would be one-fourth of 174,000 or 43,500 hp. sec.

A flywheel for a mill drive can often be calculated

*From a paper presented before the Association of Iron and Steel Electrical Engineers at Pittsburgh, Dec. 15. The author is industrial engineer, Westinghouse Electric & Mfg. Co., general engineering division, East Pittsburgh, Pa.



Power Input Curves of Cross Country Mill Showing Peaks Which May Be Reduced by a Flywheel. The upper curve was obtained with the billets following each other as rapidly as feasible. The lower curve was taken with only one billet in the mill



Power Input Curves Obtained from the Same Mill to Illustrate the Difference in Load Characteristics of a Motor Using In One Instance a Liquid Regulator and in the Other Magnetic Control. The upper curve applies to the liquid regulator and the lower one to the magnetic control

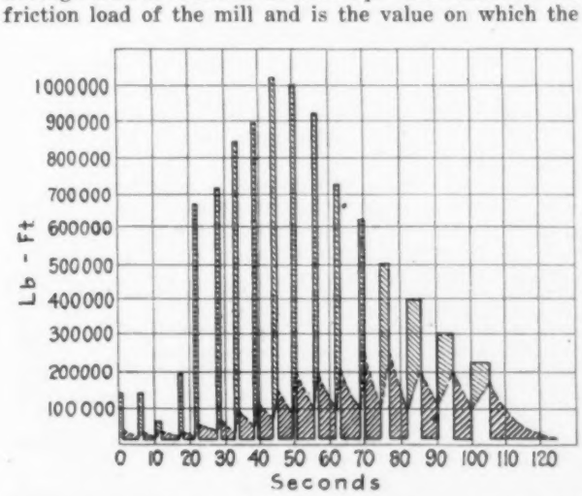
to a fairly close degree if the operating conditions are properly represented. These conditions can be obtained by comparing the mill with a number of similar mills on which an analysis of power requirements has been made. However, on some mills, it is practically impossible to make any calculations, in which case it is necessary to depend entirely on tests made on a number of mills of the same type.

Unless these tests are used as a guide, it is easy to assume conditions which will not be obtained in actual practice. For instance, tests were made on a motor driving eight sheet mills. Graphic charts were obtained, the total length of each test being 30 min. Although a large number of these charts were obtained over a long period of time, it was surprising to find that not more than four stands out of the eight had metal in the rolls at the same time. On one chart the following results were obtained:

Time during which	
no metal was in rolls	26.60 per cent
metal was in one stand only	39.10 per cent
metal was in two stands only	26.30 per cent
metal was in three stands only	7.36 per cent
metal was in four stands only	0.64 per cent

Without making such investigation, it might be thought that it would be necessary to provide flywheel effect to take a peak obtained from metal in five or six stands at one time, when in fact only three stands need be considered. On applications of this kind it is necessary to test similar mills having a different amount of flywheel effect to determine which ones have the proper amount. No method of estimating would be of any practical value. In most cases the load is not so complicated and it is a simple matter to approximate the load which will be obtained.

A curve is shown of an estimated mill load on a 3-high 28-in. blooming mill operating at 70 r.p.m. The average load is found to be 1284 hp. This includes the friction load of the mill and is the value on which the



Torque Characteristics of Motor with Fixed Resistance in the Secondary Shown in Relation to the Torque Curve of the Mill. The torque at the motor is indicated by the dashed line and the areas above and below this are proportional respectively to the energy given up and the energy absorbed by the flywheel

rating of the motor should be based. In preparing a curve like this no difficulty will be met in determining the length of the passes, as the size and speed of the mill are known.

Observations were made to determine the interval between passes and it was found that under the most favorable conditions they averaged from 3 sec. to 3.8 sec. Occasionally delays were obtained which would increase the intervals even to 10 or 15 sec., but these were unusual. There are bound to be delays which lengthen the cycle to 80 sec. or more, but it is not safe to estimate on an average cycle of 80 sec., as this extra time may be introduced after any one or more passes.

It is a simple matter to assume the minimum interval throughout and let this ideal cycle represent 25 per cent overload on the equipment. Some portion of this cycle will prevail when rolling almost every ingot, but in no case would the equipment be subject to a continuous overload. If it is desired to increase the size of the equipment over the calculated values to take care of unforeseen conditions, this can be done after the correct relation between the motor and flywheel is determined. The same factor of safety should be used on both motor and flywheel.

Selection of Flywheel

The curve is plotted, using intervals of 3 sec. between passes and 6 sec. between ingots. Since this cycle is to impose a load of 125 per cent on the motor, everything above 1600 hp. should be absorbed by the flywheel during the passes, and during the intervals the difference between 1600 hp. and 200 hp. friction load, would be restored to the flywheel. Therefore, during the 3-sec. intervals the motor is capable of returning 4200 hp. sec. to the flywheel, and during the interval between ingots 8400 hp. sec.

The values given in the second column of the table, showing the flywheel loads during the passes, are taken from the load curve. As the flywheel is of sufficient capacity to return 4200 hp. sec. during the intervals, it will be observed that the motor is capable of bringing the flywheel back to normal speed, after each pass, until the eleventh pass is reached. At the end of this interval there is a flywheel debt of 370 hp. sec. Therefore, in starting our calculations to determine the size of flywheel we should start with the eleventh pass and continue the cycle through the thirteenth back to the first and on down to the tenth. During the interval after the first pass, the flywheel debt is wiped out and the wheel again attains normal speed. This continues until the eleventh pass is reached, at which time it again comes to the heaviest part of its cycle.

In the third column of the table will be noted that the maximum energy which the flywheel must deliver is 9100 hp. sec., which is obtained by adding the energy required during the thirteenth pass of 7150 hp. sec., to that which is accumulated previous to this pass, which is 1950 hp. sec. The maximum per cent speed drop permitted is 20 per cent at 25 per cent overload. Under ordinary conditions 15 per cent will not be exceeded. In dropping down to 80 per cent speed the flywheel has given up 36 per cent of its total energy, which, in this case, is 9100 hp. sec. Therefore, the

wheel at its normal speed would have a total of 25,300 hp. sec.

As the speed of this mill is 70 r.p.m., a split cast-iron wheel can be used having a diameter of 26 ft., which gives a peripheral velocity of 5700 ft. per min. As the radius of gyration of this type of wheel is 0.8 of the outside radius the velocity at this point is 4560 ft. per min., or 76 ft. per sec. This latter value is the one which we are to use in the formula: Hp. sec. $= WV^2 \div 35{,}400$. As we are now interested in obtaining the weight of a wheel which is to have a given amount of energy, this forumla should read as follows:

$$W = \frac{\text{hp. sec.} \times 35{,}400}{V^2} = \frac{25{,}300 \times 35{,}400}{76^2} = 165{,}000 \text{ lb.}$$

Type of Control a Factor

If a liquid regulator type of control is used the input to the motor would approximate a straight line, as is shown by the curve. However, if fixed resistance is used in the secondary of the motor, to estimate the division of the mill load between the flywheel and the motor is a tedious process. The motor load follows a logarithmic curve as developed by Mr. Specht in an article before the American Institute of Electrical Engineers in 1909. A representative curve is shown where the motor load follows the dashed line.

It is important to take into consideration the type of control used, as some utilize the flywheel effect to a better advantage than others. A curve obtained from the sheet mill referred to shows the power input with notching in relays which regulates the amount of grid resistance of the secondary circuit of the motor, while the other curve is taken with the liquid slip regulator in the secondary circuit. The flywheel effect is the same but the regulator does not come into action until the motor is fully loaded. With grid resistance in the secondary of the motor, the flywheel and motor slow down in direct proportion to the load, and when full load on the motor is obtained, the flywheel may be operating at 15 per cent slip and any further peak load cannot be absorbed by the flywheel to the same extent as if it were at its full speed, as is illustrated by the two curves. It will be noticed that the average load in each case is 1100 kw.

When motors are applied to tandem or cross-country mills on which the majority of passes are rather long a flywheel would appear unnecessary. The mill, however, may be so arranged that there is an overlapping of several passes which will impose short high peaks on the motor. A curve showing the power input to a motor driving a mill of this type is given. The lower curve was taken with but one piece in the mill and the upper curve with the mill operating at full capacity. If the necessary flywheel effect were installed, the short peaks, as shown, would not be thrown on the motor.

Some General Considerations

The flywheel should be placed as near the load as possible to avoid transmitting the peaks through apparatus which might otherwise carry only the average load. However, on some applications, such as sheet mills, this is not feasible, as the mill speed is too slow. If it were desired to properly equalize the load on an 8-stand mill with a flywheel operating on the mill shaft at 30 r.p.m. a wheel of 350 tons would be required. With electric drive, the motor is usually operating at about 240 r.p.m. and by placing a flywheel at each end of the pinion shaft 30 tons will provide the same effect as 350 tons placed on the mill shaft. This has the disadvantage of transmitting all the peaks through the gears, but is the practical solution for this type of drive. Where sheet-mill engines have been replaced by motors with adequate flywheel effect, the monthly output is increased approximately 10 per cent. This is due to the elimination of periods when the mill is slowed down sufficiently to interfere with its operation.

Plate wheels are usually limited to a peripheral speed of 25,000 ft. per min. to keep the centrifugal stress within 16,000 lb. per sq. in. Due to the presence of blow-holes and shrinkage strains, it is impossible to calculate the actual stresses in the cast wheels, so that the values of 12,000 ft. per min. for solid cast steel and 6000 ft. per min. for cast-iron wheels, have been arrived at arbitrarily as safe speeds. There are a number of cast-steel wheels operating as high as 17,000 ft. per min., but they are of special design and more expensive, due to the rigid specification they are required to meet.

Machine-Tool Controller Developments in 1917

A number of different types of controllers for the motors driving machine tools were developed in the past year by the Cutler-Hammer Mfg. Co., Milwaukee. They include three automatic types, a controller for planing machines and a line of semi-automatic motor starters.

The first of three automatic units is intended for use with machines driven by motor where the necessary speeds are obtained by the use of gears. With this controller the motor may be started, stopped or reversed automatically. In the second type the motor is started automatically and the different running speeds are provided by adjusting the field rheostat to give the rates required for the various operations. With this controller, it is stated, the motor will always be brought up automatically to the speed for which the field rheostat has been set, irrespective of the number of stops made between adjustments. This controller is intended for use on boring mills, milling machines and like tools where the speed is only changed infrequently and it is desired to maintain a fixed rate for a certain operation. The other type gives complete control of the starting, stopping and reversing of the motor from one point through a conveniently located handwheel while the panel for the automatic control devices is mounted where it will not interfere with the workers. A controller for planing machines has also been developed and put to considerable use in large munition plants.

The new semi-automatic inclosed motor starters are made for direct and alternating current motors. They are intended for use with motors employed for such service that manual control of starting and stopping is satisfactory but it is desirable that the rate of acceleration be independent of the operator. The starting movement of these controllers is of the multiple-contact type and is operated by a handle or lever outside of the inclosing case. To start the motor the lever is raised as far as it will go and held there. When the handle is released the starting resistance is cut out of the circuit by the gravity actuated accelerating movement which is under the control of an air dashpot. The duration of the acceleration period may be varied by changing the adjustment of the air inlet of this dashpot.

Another development is a handle or chain and sprocket-operated controller for direct-current motors. It provides a speed range of 3 to 1 and with the chain and sprocket operating arrangement, the control can be located on the apron of a lathe, for example, or any other convenient place.

Motor Trucks Increase California's Mineral Output

California has become a more important source of minerals and metals in recent years. The following products are listed with their 1916 output, by the California State Mining Bureau:

Antimony ore, tons	1,015	Manganese ore, tons	13,404
Chromite ore, tons	48,943	Potash, tons	17,908
Copper, lb.	55,809,019	Pyrite, tons	120,525
Dolomite, tons	13,313	Tungsten concentrates, tons	2,270
Iron ore, tons	3,000		
Magnesite, tons	154,052	Zinc, lb.	15,950,565

Until recently California was the sole producer of chromite and magnesite in this country. About 75 per cent of the quicksilver of the United States is produced in that State. Motor trucks have been a potent factor in opening up mineral properties at formerly unprofitable distances from railroads, resulting in the construction of better roads everywhere.

Safe Practices in the Open-Hearth

Successful safety work in the open-hearth department of a steel plant is dependent on the attitude of foremen and more largely than is generally recognized on the attitude of the superintendent, according to Leslie M. Rice, district safety inspector of the American Steel & Wire Co., Worcester, Mass., whose paper presented before the National Safety Council at its annual meeting in New York is the subject of the following review. The superintendent, he said, must realize that the men are more influenced by deeds than by words. The executive who talks safety but does not act it will find that his employees are guided by his actions. They consciously or unconsciously imitate the attitude of superiors.

The tapping hole of the stationary type of open-hearth furnace, more particularly in the basic heats, is occasionally opened up by the action of the metal from the inside, due to faulty workmanship or material, before the heat is ready or the operator ready to receive it. Serious consequences may result if the metal reaches a sewer or damp place on the floor. To avoid such contingencies, the ladle should be set in position ready to receive the heat on suitable stationary horses shortly after the charge is melted.

Operators of hot-metal electric cranes should inspect the crane parts, and especially the brakes previous to handling a heat. The brake should be tested by trying it out with the empty ladle hanging on the crane and later examining the brake. Failure of the electrical current during the progress of a heat may be disastrous unless the brakes are in good condition. The controlling valves for gas and steam lines located in front of the furnace are commonly uncovered. Numerous instances have occurred where they were broken by being struck by the crane or charger, resulting in severe burns to some of the workmen. They should be covered. Charger operators should have a shield to protect them from sparks thrown from the furnace where damp or frozen stock is dumped into molten slag or metal. Even in the best practices bottom blowouts will occasionally occur, and, if they are not well handled, serious accidents may result. The men should be drilled to their parts in handling the situation as they would be schooled for a fire drill.

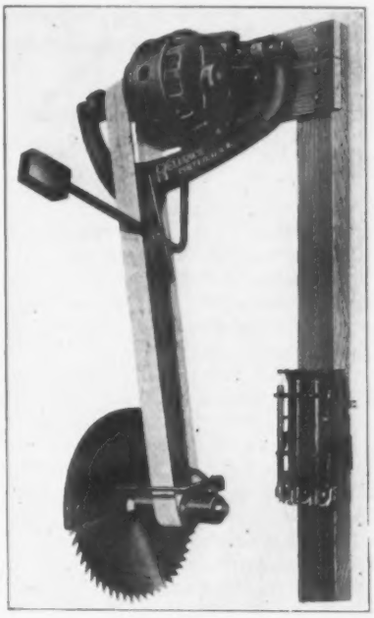
Each case of accident must be studied. For instance, a man on the pouring platform was badly burned on account of the falling of the lever which manipulates the stopper in the ladle. Investigation developed the cause of its falling and also that a small dog fastened to the lever would prevent the recurrence of such an accident. Another case is of a man who was caught between the bucket cars on the charging floor while shoveling scrap which had fallen from the buckets onto the floor back into the buckets again. While there was a rule requiring the charger to see that the men were clear of the cars, it developed that the responsibility was not properly divided. To overcome this a whistle was provided for each furnace man to direct the movements of the cars.

An open-hearth pit job entails more or less congestion. We are also likely to find the men using not only defective tools but keeping them in untidy places. In one instance it was decided to build steel lockers for bars and other tools, one in one part for the day turn and one in another part for the night turn, and in a place where the men would have a brick floor. Later we found the tools in a better condition and the whole place tidy. The same thing may be said of pouring platforms. Proper racks should be maintained for bleeder rods, test scoops and bars and a proper platform with brick paving for men to work on, with suitable means of getting to and from the platform.

A prospective open-hearth crane operator should be employed for a period of about three months in the electrical department, where he will have an opportunity to acquire some knowledge of the electrical apparatus, then three months on the crane with another operator. If he appears to measure up to the job, he should be examined by the master mechanic and the chief electrician.

A New Motor-Driven Swing Saw

The latest addition made by the Reno-Kaetker Electric Co., Cincinnati, to its line of swing saws is one that was especially designed for the use of shipbuilders in cutting up heavy timbers right on the work. This saw, which is marketed under the trade name of Reliance, is a compact rigid machine, and is self-contained, having a 10-hp. motor mounted directly in the saw base.



Heavy Timbers Up to 14 In. Square Are Cut to Length by a New Self-Contained Motor-Driven Swing Saw Which Can Be Set Up at Any Convenient Point

A heavy rigid swinging arm is suspended from this base, and carries a 36-in. belt-driven saw blade, which is capable of cutting timbers up to 14 in. square. The saw blade is protected by a guard and a roller weight automatically tends to throw the saw back out of the way when the operator releases the handle. The saw arbor is equipped with phosphor bronze ring oiling bearings, instead of babbitt bearings, which the manufacturer claims gives the machine a longer life.

The maker states that for shipbuilding purposes it has been proved to be a valuable tool, as it can be hung at any convenient point for the work where electric current can be had. The company also builds smaller sized machines for different classes of work.

Patriotic Bonus Plan

The Queen City Machine Tool Co., Cincinnati, has recently adopted a bonus system for its employees, which is best described by giving a verbatim copy of notices posted in its shop, as follows:

"Beginning Jan. 18, every man who makes four full weeks straight will get five 25c. thrift stamps. This is 210 hours for floor men, etc., and 240 hours for overtime men. If 12 full straight weeks are made, we will give one extra 25c. stamp and pay the odd amount to make a $5 war saving certificate.

"If 10 hours or less are lost, making 200 or 230 hours or more, respectively, in the four weeks' period, we will give four 25c. stamps. If more than 10, but 30 hours or less are lost, making 180 and 210 hours or more, respectively, in the four weeks' period, we will give two 25c. stamps. We hope that for each war saving certificate our men earn by attendance they will buy another and thus help our Government finance the war. Fourth of July, Labor Day, Christmas and New Year's Day allowed as holidays.

"We reserve the right to discontinue this arrangement at the end of any 12 weeks' period."

The building and grounds of the Engineers' Club of Dayton, Dayton, Ohio, to be dedicated on Feb. 2, are the gift of Col. E. A. Deeds, vice president National Cash Register Co. and president Dayton Engineering Laboratories and Chas. F. Kettering, vice president and assistant general manager of the Dayton Engineering Laboratories. Col. Deeds is now chief of the equipment division, Signal Corps, U. S. A., and a member of the Aircraft Board.

Many Problems for the Shipping Board

Germany Objects to Agreement with Holland—Demoralization of Labor Due to Competition Among Employers—Standard Scale Proposed

WASHINGTON, Jan. 29.—The shipping situation is again causing the deepest concern to the Administration and to exporters of war material who, with shippers of food products, are now chiefly concerned in the country's out-bound foreign trade. The subject has a dozen angles, among them the failure of the War Trade Board to complete satisfactory negotiations with the Japanese Government to sell certain ships in exchange for a supply of steel plates; complications that have arisen since the United States a few days ago succeeded in chartering from the Dutch Government 80 vessels, the majority of which are now in American waters; the grave difficulties now attending the bunkering of vessels carrying war materials, troops, etc., to France, and unprecedented labor conditions in the shipyards having contracts of the Emergency Fleet Corporation brought about by a wage scale so high that construction is being seriously delayed instead of expedited thereby.

Conflicting reports with regard to the status of the negotiations for the transfer to the United States of a number of Japanese ships in exchange for licenses to export a considerable tonnage of steel plates are credited to the Japanese authorities at Tokio and to the War Trade Board which has conducted the negotiations in conjunction with the Shipping Board. According to advices from Japanese sources, the ships in question have been tendered the United States at "reasonable prices" and only a "relatively small tonnage of steel plates" has been sought by Japanese ship builders. In Washington, however, it is stated that the Japanese authorities are holding out for prices substantially greater than the average of the contracts which the Emergency Fleet Corporation has made for vessels superior in speed and equipment to those under negotiation.

An Awkward Situation

Whatever the merits of the controversy may be, the deal appears to be deadlocked and a decidedly awkward situation has therefore been produced as to the ship plates which form a part of the consideration for the transfer of the Japanese vessels. A large proportion of these plates are understood to have been shipped to the Pacific Coast for storage, pending the completion of negotiations and for the purpose of gaining time in transit. It is reported here that the owners of some of these plates have been obliged to dispose of them to domestic shipbuilders and that, owing to the uncertainty surrounding the deal for the Japanese vessels, no attempt has been made at replacement.

Germany Objects

The cable advices which reached Washington on Jan. 23 to the effect that an agreement had been signed in London under the terms of which the Dutch Government agreed to lease to the United States for a specified period some 80 vessels belonging to the Holland-America and other lines were very encouraging to the Administration and were regarded as a successful conclusion of negotiations set on foot several months ago by the War Trade Board with the Dutch mission here. More recently, however, the German Government has served notice on Holland that these charters to the United States are a breach of neutrality for which reprisals will be made. How far Germany is prepared to go in this matter can only be surmised, but the danger is that the Dutch Government will be forced to cancel the agreement or to so hedge it about with such new restrictions as to make the charters valueless for the purposes for which they have been negotiated.

The American Government has at no time anticipated using these Dutch ships for transportation of war material or troops to France and, under the terms of the agreement with Holland, it was specifically provided that they should not be permitted to ply in the war zone. It was expected, however, to use them in the coastwise trade of the United States and in foreign trade with South America and other neutral countries, thus releasing a considerable amount of American tonnage which would be employed for transporting munitions, locomotives, steel rails, and other supplies for the American Army in France. The German Government, however, according to such semi-official organs as the *Cologne Gazette*, takes the position that, under the provisions of the Declaration of London and in accordance with Anglo-American marine law, ships in the coastwise service of an enemy country become enemy ships, even though they fly a neutral flag and the owners are neutral subjects. By this line of reasoning, the 80 vessels chartered to the United States by Holland become enemy ships and a nation sanctioning such a deal is guilty of a breach of neutrality. No attempt is made to veil the threat embodied in the declaration of the journal quoted that Germany "will remind Holland of this when the inevitable happens and the demagogues raise the cry of German atrocity."

Serious Labor Conditions

Although there has been a marked decrease in the sinking by German submarines of allied vessels, there has been a slowing down of work in American shipyards that more than offsets this encouraging fact. The complete demoralization of labor appears to have been brought about through the competition of shipbuilders and other manufacturers, and there is a crying need for wage standardization, without which the situation promises to go from bad to worse. Testimony recently given before the Shipping Board and quoted in this correspondence indicating that high wages have resulted in idling to such an extent as to reduce the effectiveness of the working force in some yards as much as 30 per cent, has been supplemented by more specific reports from many yards which indicate not only that production is being slowed down but that yards working under cost-plus-profit contracts are allowing the public money to run away in an unrestricted stream. The Shipping Board officials are making every effort to speed up the work and insist that all yards having Emergency Fleet Corporation contracts shall run three eight-hour shifts and in some cases shipbuilders have been asked to include Sundays.

In spite of the gravity of the situation and the necessity for a very substantial increase in the rate of production, if any of the recent estimates of the Shipping Board are to be even approximated, efficiency is declining to a marked extent according to every available standard of output. The labor turn-over in the Delaware district is said to be increasing in almost direct ratio to the climbing wage scale, men going from one yard to another, tempted by offers of increased pay, each employer evidently concerning himself only with progress in his own establishment.

The seriousness of the situation developed by the unprecedented labor turn-over may be gathered from the report from one shipyard that, although no workmen have been discharged, 2300 hull workers have left its employment during the past three months. Their places are said to have been filled by floating workmen from other yards who have required special training, causing much delay and unnecessary expense. The labor turn-over in one Pacific Coast yard is said to average at the present time 175 new men hired daily to take the place of those leaving for other employment.

General labor conditions in the shipbuilding industry on the Pacific Coast are reported as very unsatisfactory. The high wage scale paid in practically all the yards and the low speed permitted has made it prac-

tically impossible to induce men to engage in piecework, a system resorted to in certain yards to speed up production.

The officials of the Shipping Board are fully advised of these conditions and are making the most vigorous efforts to improve the situation. There are, however, practical difficulties in the way of a standard wage scale, as it would be impossible to enforce such a scale in all sections, and where important variations existed there would be the same temptation as at present for workers, especially young unmarried men, to shift about in pursuit of the highest pay. The 10 per cent bonus paid under the authority of the board to men working six days a week is not producing the desired results, reports indicating that, while workers keep at their tasks for six-day periods, they do so only long enough to accumulate sufficient amounts to enable them to idle for extended periods. W. L. C.

Large Tin-Plate Exports and Their Destination

Tin-plate exports continue to be of very large proportions. For the last five months officially reported, or from July to November inclusive, they have averaged 36,362,510 lb. per month. The largest month was November with 47,658,240 lb. While this monthly outgo is large, it is a little less than the rate at the end of the last fiscal year, when the total exports for that year were 521,861,390 lb., or 43,488,449 lb. per month. The exports for the fiscal year ended June 30, 1915, were only 179,221,644 lb. In two years these exports have grown three-fold.

For the ten months ended with October, 1917, the exports of tin and terne plates were 421,137,657 lb., or 35,094,844 lb. per month, which compares with 433,093,373 lb. to Nov. 1, 1916, or 36,091,114 lb. per month. This shows that the outgo is slightly less now than six months or a year ago.

It is interesting to note the destination of these exports now as compared with two years ago and with the normal flow in 1913. The following table gives the countries to which certain quantities went for the 10 months ended Oct. 31, 1917, and 1915, and the total exports for 1913:

Tin and Terne Plate Exports from the United States in Pounds

	10 Months Ended Oct. 31, 1917	10 Months Ended Oct. 31, 1915	Calendar Year 1913
Total	421,137,657	273,575,592	129,499,353
To			
Canada	110,928,536	68,018,174	100,347,505
Argentina	44,137,986	27,146,844	2,065,581
Japan	42,063,218	14,538,438	509,245
British India	28,676,777	18,875,804	62,591
Italy	25,613,588	5,338,897	None
Brazil	22,539,316	14,476,557	4,453,963
Hong Kong	21,844,004	13,843,829	894,399
Cuba	6,723,634	5,651,240	5,590,089

The striking fact in these figures is the great expansion in the outgo to Japan, British India and South American countries. The imports into Japan from this country have increased 80 times since 1913, while those to British India have grown much more in proportion. Italy's proportion is also very large now. While the quantity Canada is taking is still larger, it has not grown in proportion to the expansion in the total.

With the opening of 11 branch offices in Baltimore, the campaign to secure 5250 men for work in the shipyards as Maryland's quota toward the 250,000 wanted throughout the country, has been started by John K. Shaw, chairman of the Committee on Labor and Employment. The War Shipping Committee of the Baltimore Merchants' and Manufacturers' Association has taken up the campaign to increase the shipbuilding and will have Major M. S. Boehm, of the Canadian Army, who lectures and exhibits pictures to aid the work, give his lecture in Baltimore in the near future.

RUSHING NEW LOCOMOTIVES

Baldwin and American Plants Under Control of Director General of Railroads

Construction of locomotives to relieve the present shortage of motive power on the railroads is being speeded up in every possible way. The Baldwin Locomotive Works and the American Locomotive Co. have been hampered considerably by the very thing they are seeking to remedy—railroad congestion—but by order of Director General of Railroads McAdoo they now receive priority along with shipyards and other important Government work.

The locomotive shops have been placed under the control of the railroad director and their entire output is subject to his orders. Under this control the companies are straining every energy to obtain maximum production, and the disposition of the locomotives after they leave the shop no longer concerns them.

Coal roads are getting locomotives first regardless of whether they had ordered them or not. In fact, railroads which have placed orders for locomotives will not receive them under the new way of handling the business until the present freight congestion is relieved. In any event, locomotives will be sent where they are most needed as long as the railroad crisis lasts.

So great is the shortage of locomotives on nearly all roads that it will take all of this year, in the opinion of an official of the American Locomotive Co., to put the railroads in a position to handle the tremendous volume of freight now being offered in anything like an efficient manner.

Quite a large number of the locomotives built in American shops for Russia have been altered to suit our own roads and they are now being used to relieve the traffic tie-up. Many of the U. S. A. locomotives built for the American railroad in France are also in use in this country. About 150 of these locomotives are now in service in France.

The Baldwin Locomotive Works in Philadelphia is now turning out about one locomotive every hour. Last week's record, THE IRON AGE was told, was 88, of which the most were standard gage railroad engines of heavy types. The capacity of the Baldwin shops is 100 locomotives per week, but owing to difficulties in obtaining shipments of material, the labor shortage and other reasons this production has not yet been attained. Officials of the company are confident that they will reach that maximum soon. Work has been started by the Baldwin Locomotive Works on a new erecting shop, which will be completed about the middle of the year. The addition of this shop and equipment will make it possible to assemble the engines more rapidly, thus increasing the output above the maximum mentioned.

The February schedule of the American Locomotive Co. provides for the construction of 222 locomotives, practically all of which are standard gage engines for railroads, many being of the Mallet and Mikado types. The Richmond, Va., and Montreal, Que., shops of the company are being converted back to locomotive work as rapidly as possible, they having been equipped for shell work in 1915. As soon as this conversion is completed the output of the company, an official says, will be increased by at least 25 to 30 locomotives per month.

Australia's First Electric Steel Plant

Electric steel is being made in Australia. The first plant of the Australian Electric Steel, Ltd., at Alexandria, Sydney, is equipped with a 2-ton Electro-metals two-phase furnace with current from the 5000-volt three-phase circuits of the City Council through transformers. The plant has been in operation for nearly a year and its output is principally castings low in carbon and special alloy steel castings for mining and electrical work; the charge is common steel scrap and pig iron. The company has already commenced the erection of a similar plant in Western Australia. The transformers are Scott-connected.

ESTABLISHED 1855

THE IRON AGE

EDITORS:

A. I. FINDLEY WILLIAM W. MACON GEORGE SMART

CHARLES S. BAUR, *Advertising Manager*

Published Every Thursday by the IRON AGE PUBLISHING CO., 239 West 39th Street, New York

W. H. Taylor, *Pres. and Treas.* Charles G. Phillips, *Vice-Pres.* Fritz J. Frank, *Secretary* M. C. Robbins, *Gen. Mgr.*

Owned by the United Publishers Corporation, 243 West 39th Street, New York. H. M. Swetland, *Pres.* Chas. G. Phillips, *Vice-Pres.* W. H. Taylor, *Treas* A. C. Pearson, *Secy.*

BRANCH OFFICES—Chicago: Otis Bldg. Pittsburgh: Park Bldg. Boston: Equitable Bldg. Philadelphia: Real Estate Trust Bldg. Cleveland: Guardian Bldg. Cincinnati: Mercantile Library Bldg. San Francisco: 320 Market Street.

Subscription Price: United States and Mexico, $5.00 per year; single copy, 20 cents; to Canada, $7.50 per year; to other foreign countries, $10.00 per year.

Entered as second class matter, June 18, 1879, at the Post Office at New York, New York, under the Act of March 3, 1879.

Future Government Buying of Steel

The latest developments in the reorganization of the War Department and especially the appointment of Colonel Pierce as director and Edward R. Stettinius as surveyor-general of purchases, not to mention the virtual abandonment of the War Industries Board, raise some very interesting questions as to the future policy of the Government in the buying of iron and steel and in readjusting the schedule of controlled prices, which expires March 31, next. The extension of the September schedule, made in the closing days of December, was negotiated by the War Industries Board with the co-operation of the Federal Trade Commission, the Fuel Administration, and J. Leonard Replogle, director of steel purchases. With the designation of Colonel Pierce as director and Mr. Stettinius as surveyor-general of all War Department purchases, the exact relation of Mr. Replogle and of Mr. Meyer, who is in charge of copper purchases, as well as of their colleagues holding similar posts, is uncertain and is likely to remain so until the fate of the Chamberlain bill for the creation of a director of munitions has been determined. Mr. Replogle and Mr. Meyer have both rendered invaluable service to the Government and it is not believed that they will be released or relieved of responsibility. There is, however, much interest in the question as to the fate of the War Industries Board and the conditions under which the trade experts now connected with it will continue to serve the Government.

Germany's Outlook in Steel

During the first three years of the war the German iron and steel industry voluntarily subscribed 350 million marks, or about $87,500,000, to the relief of workmen. Largely owing to government action, wages have been advanced to a point which it is realized threatens the country's competitive standing in the world's markets after the war. By government favor the returns to steel manufacturers have been made highly lucrative, and at the same time war profits taxation is far less than in Great Britain or the United States. The present favored condition of the industry was commented on at a recent meeting in Berlin of representatives of nearly all German iron and steel plants, bridge builders and car works and some shipyards and foundries. The present scale of rewards to employers and workmen, it was argued, can only be prolonged when peace returns by protection against foreign competition and by the annexation of territory which will increase Germany's supply of raw materials. Only a "German peace" can maintain the German steel industry at its present or pre-war level and prevent it from assuming a less commanding rôle after the war than it had before.

The unfavorable possibilities ahead of the German steel trade have been clearly emphasized in the answer of a German professor, when asked to what extent the German iron mines can supply the iron works of the country after the war. He replied that in the peace negotiations the pressing needs of the German iron and steel industry must be especially watched; that first of all sufficient sources of iron and manganese ore must be assured, for on such supplies depends the existence of the empire and the people.

It was not until the third year of the war that Germany was forced to a fuel-saving shut-down. And even then there was no peremptory stopping of the wheels of industry. Ambassador Gerard has this description of it in his book:

> The third winter of the war, owing to a breakdown of means of transportation and want of laborers, coal became very scarce. All public places, such as theaters, picture galleries, museums and cinematograph shows were closed in Munich for want of coal. In Berlin the suffering was not as great, but even the elephants from Hagenbeck's Show were pressed into service to draw the coal cars from the railroad stations. Light was economized. All the apartment houses (and all Berlin lives in apartment houses) were closed at 9 o'clock. Stores were forbidden to illuminate their show windows and all theaters were closed at 10. Only every other street electric light was lit; of the three lights in each lamp, only one.

Rating industrial activity high in the scale of war-winning activities, Germany issued no order closing down shops.

No small credit is due the steel industry of the country for its record in the production of ferromanganese since the war started. The expansion has been early 250 per cent since 1914 and has

nearly set at rest an uneasiness which for many months was acute. While this is true, the performance in the last two months of 1917 is not encouraging. An analysis of the situation appears on another page. After attaining an average of about 24,000 tons per month in the four months beginning with July, production fell to about 19,000 tons per month for November and December. The imports in the last half of the year declined to one-half what they were in the first half and to only one-fourth what they were before the war. Added to this is the disturbing news that the Brazilian Government has suspended transportation of minerals on the Central Railway because of a shortage of coal, and the shipments of manganese ore are held up. This railroad carries most of the manganese ore that has been imported into the United States since the war started. The continuance of these unfavorable conditions opens up serious possibilities for the steel industry.

Our Undeveloped White Coal

If the disruption of industry caused by the order of the Fuel Administrator awakens a real interest in the development of the hydroelectric possibilities of the affected district, it will help to turn into profit an act that has met with much condemnation. The President has shown an active interest in the matter and serious though slow-moving investigations are under way. Unfortunately the popular mind has been influenced by the publicity given to the gigantic development schemes for harnessing the streams of the Pacific coast and the really great work that has been accomplished by some Eastern hydroelectric companies has attracted but little popular interest.

A great industrial section, the New England States, has been hampered for months by a shortage of coal. In many instances production has absolutely ceased for short periods. Just what a comprehensive development of comparatively small water powers means to a city and its industries is found in the case of Greenfield, Mass., where the fuel order caused no suspension of the city's large industries because the power that moved the factory wheels came from the Connecticut and Deerfield rivers. In its neighborhood are two of the most notable hydroelectric developments on the Eastern seaboard: the Turners Falls Power & Electric Co. and the New England Co., operating two subsidiary companies, the New England Power Co. and the Connecticut River Transmission Co. From the power houses of these companies a network of wires covers central and western Massachusetts, Rhode Island and northern Connecticut.

Providence, Pawtucket, Worcester, Fitchburg, the military city of Camp Devens at Ayer, and many other cities and towns are making large use of this power. President Henry I. Harriman of the New England Co. is authority for the statement that the undeveloped water power of New England is equivalent to the energy that can be developed from 5,000,000 tons of coal. A report of the bureau of corporations of the United States points out the possibility of a water-power development of 1,000,000 horsepower, which by storage and by the utilization of the less desirable water powers can be increased to 2,000,000. Mr. Harriman also points out how, by entering into some arrangement with Canada, additional power for New England could be secured by development of the almost untouched power streams of our neighbor, such as the St. Lawrence, the St. John, the St. Croix and others.

The greatest possible source of additional power for New England is the Maine rivers with the splendid natural storage of the great lakes from which they flow. Unconstitutionally, as good lawyers claim, and unwisely, Maine has passed a law forbidding the sale of power from these streams in neighboring states. Legislative barriers to the interchange of electric power will not long withstand the pressure of an aroused public opinion. The Penobscot River with a fall of 1500 ft., the Kennebec, 1000 ft., the Androscoggin, 2200 ft., the St. Croix, 440 ft., properly developed and widely employed to move trains, operate factories, and light and heat whole communities mean the saving of a 700-mile haul of thousands of cars of coal.

Unfortunately our national interpretation of navigable streams is that any stream is navigable down which logs can be floated. How this has stood in the way of power development can be easily appreciated. It is claimed that Federal restrictions have prevented at Windsor, Conn., the conversion of the greatest head of water on the Connecticut River into useful power for Springfield, Hartford, New Britain and other industrial centers. Experts claim that the Windsor development, with increased storage further up the valley, would double the power capacity of the Connecticut watershed. What this would mean to industry can be seen from the fact that the Turners Falls and New England developments on this watershed now furnish power equal to 600,000,000 kw.-hr. annually. The manifold economies of hydroelectric power may some day warrant the statement that such development, sure to follow the first decline in the present cost of plant structure and equipment, helped the nation to recuperate after this war, as was said of the steam engine in relation to English industry after the Napoleonic wars.

Criticism Not Faultfinding

It is a natural coincidence that criticism of the administration of the war should come at a crisis. Etymologically the words are akin, both coming from the same Greek root, meaning to judge, discern, separate. Criticizing is judging. A crisis is a point of separation, a time when things are going to go either one way or an altogether different way. The American people have been indisposed to criticize or to judge, but when events show that a crisis has been reached, when undesirable things have accumulated so as to form a definite menace, the right to criticize is asserted.

It is of the utmost importance, not merely that that the word criticism should be rightly understood, but that the true bearing of the action should be apprehended. Criticizing is not finding fault;

it is rendering judgment. Criticism recognizes good and bad points equally. In the matter of conducting a war, it is necessary to get the proportion of things. Apart from the disposition of some Washington circles to regard criticism as fault-finding, there is evidently a failure to grasp the proportions. There has been clearly shown a conception that inasmuch as certain great things have been accomplished in preparing for actual warfare, various delays and slips should be overlooked or condoned, as being unimportant in proportion to the things that have been accomplished.

That is not the spirit of criticism. The painting is not approved for its good points if it has faults which a painter skilled in his art could have avoided. Now, criticism of certain departments runs largely to the direction that certain things could have been accomplished and were not. That other things were accomplished does not justify the omissions.

Much of the criticism that has been made has been accompanied by statements of how the thing criticized could have been avoided. Nearly all the criticism seen is distinctly constructive in character, and the American people will not tolerate a propaganda that such criticism should be withheld. Its right to criticize, to judge, to discern, to separate, is unquestionable, and now of all times the people must uphold that right. It is vastly more important now than at any other time.

The greatest single criticism is that preparations for waging war have been wofully interfered with by Government red tape. That is a specific and a constructive criticism. There is not a successful business house of any magnitude to-day that has not rid itself of a great deal of red tape in the past few years. The abolition of receipts for payments made by check is one among scores of examples that could be cited, conspicuous from its broadness of application and simplicity. Red tape can be largely done away with, as business men know from their own experience. It is for the American people to demand that this and other reforms plainly called for should be carried out immediately.

Wanted—A Plan of Action

In THE IRON AGE'S review of the effects of the shut-down order on New England metal-working industries last week, it was said that the mayor of Hartford, Conn., and a committee of manufacturers in that city undertook the task of unloading on the first two days of the week about 1000 freight cars then in the Hartford freight yards. Under the direction of picked men more than 3000 workmen thrown idle by the Garfield order and more than 100 large motor trucks loaned by manufacturers were engaged in the work. A similar campaign should have been undertaken at every important freight center in the country.

The most culpable thing about the Garfield order was that it had nothing in it suggesting action, but was simply a command that workers quit and that the wheels of industry stop. The emergency was one of the greatest in the history of the country. At Dayton, Ohio, five years ago a flood brought to the front a captain of industry who marshaled the men of the city and worked day and night to relieve suffering and repair damage. What was done under that kind of leadership thrilled the nation. This winter the whole country has been stricken by a Dayton misfortune hundreds of times multiplied. Thousands of men of executive capacity have been ready to help in the transportation crisis that is now paralyzing the national arm upraised to strike a decisive blow. But there is no call from Washington to which they can respond, no plan under which they can work—simply an order to cease from producing under penalty of the law. The attitude of mind throughout industry is not that of frantically calling for somebody to do something, but rather of humiliation at an official order to stop production that is not accompanied by a definite program by which men thrown idle can be used in breaking the freight blockade.

CORRESPONDENCE

An Ohio Manufacturer Discusses the Shut-Down Order

To the Editor: In your first article, issue of Jan. 24, you take up the "five-day shut-down" order. You seem to question the order. This order seems to have been widely opposed and criticized, as well as widely misunderstood. If I may submit a few suggestions, would say:

People in Ohio were out of coal in their homes in thousands of cases. They could not very well wait until spring for a Congressional investigation. We all know how slow a Congressional investigation is. People cannot hibernate, like the Russian bears, and wake up in the spring all O. K.

The writer went personally twenty times, probably, to coal offices to get coal, but always without success. No coal was to be had. So we ordered wood and have been burning wood.

You say that experts figured that there would not be so much saving in coal. You do not seem to understand that in Cincinnati the Fuel Administrator "took over" all coal arriving during the five days for industrial firms (except those exempted) and sold the coal to the people to warm their homes. Whether there was a saving or not, the people got the coal just the same (which they would not have got otherwise).

People talk about rushing production, using water power, etc. They do not seem to realize yet that the railroads had broken down, could not handle the freight, and could not hope to. The cause of the breakdown of the railroads is not so obvious, but explanations have been given. It is said that the Interstate Commerce Commission limited the railroads too much for proper progress. The war increased the demands on railroads. (How many engines and cars would be required to transport 10,000 soldiers home for Christmas and back to the cantonment again?)

Every board used in cantonments had to be hauled. Every stick and steel plate used in building ships has to be hauled in cars. Every airplane and all its components must be hauled. All the workmen need transportation as a rule. The Government needed all the steel for preparing for war (we had been sluggards as far as war work went), and hence the railroads had trouble to get steel for improvements.

The weather has been very unusually severe. The paper stated a few days ago that an engine that would haul 80 cars in fair weather would haul only 20 cars in below-zero weather.

Now, after all the fussing about the five days shut-down (really only three and one-half days—Friday, Saturday forenoon, Monday and Tuesday), we have an embargo and cannot ship general freight. We have

not been able to ship any cans for several weeks, on account of the embargo.

The ships loaded with goods for our boys "over there" were reported as waiting, and waiting in vain, for coal. It would have been a crime to leave the boats without coal, especially as recent reports show that our boys have not been well provided for, apparently, "over there."

It is suggested that we have a shorter day. That might save some coal. However, when a large store is heated it would perhaps not require much coal to keep up heat an hour longer. At any rate, the Fuel Administrator could not seize the coal, apparently, as he could do on "heatless" Mondays. You understand that all coal arriving on Sunday and Monday would be seized and sold to domestic heating, if necessary.

We must not get nervous. We may get wrought up too much about getting goods out. We must produce, and produce enormously, but we must produce systematically, carefully and rationally. If we hurry too much, exhaust the coal supply, or overtax the railroads, we do not help matters any. Doubtless with better weather the railroads will be more efficient, and it may be that some of the engines will receive much needed repairs.

Some of the people who have been doing the most kicking seem to think that it does not matter if many people do freeze and that they will thaw out and be O. K. in the spring. It was reported in the papers Jan. 24 that 8000 families in Dayton, Ohio, were entirely out of fuel.

E. L. ARNOTT,
Ever-Ready-Can Co.

Greenfield, Ohio, Jan. 26, 1918.

To Facilitate Transportation of Coal

To the Editor: To facilitate the movement of coal I wish to suggest the use of a train of flat cars having hinge side boards, the entire train to be unloaded upon a previously prepared board floor or place made convenient for loading of wagons or trucks for delivery to various points throughout the city. The prepared floor would have a length equal to the train length. The flat cars would be unloaded by a train unloading plow, as has been used for years in railroad and canal construction, the plow being pulled by the locomotive over the entire length of the train of cars by a long steel cable.

A train of twelve cars of gravel can be unloaded in from 10 to 30 min. by this method. There is no reason why coal cannot be handled in the same way.

Cleveland. JOHN A. MATHES.

Burning Low-Grade Soft Coal with Forced Draft

To the Editor: The recent scarcity of mined bituminous and high-grade anthracite coal has brought on the market a lot of low-grade coal that in years gone by has been considered worthless. Reports from the mining sections are that this is being dug out from the rivers and piles and being shipped into the big cities where there is a ready market for it. This coal having a larger percentage of slate in it, has not the life that a good grade of anthracite or bituminous has, but it could be burned with considerable trouble, particularly by using a heavy forced draft.

The so-called turbo blower or engine-driven blower that is direct connected to the boiler it operates is not very well adapted for this kind of coal if the full output of the boiler is required. These types of blower drop in speed when the boiler pressure goes down and renders them practically useless just at the time when they are most needed.

The best type of blower to use is one from an outside source of power supply, so that the speed of the fan can be increased when the boiler pressure goes down. The fan should be connected to a variable speed motor, engine or speed changing mechanism, and if it is connected to its own boiler, to have the power equipment heavy enough to increase the speed of the fan on the low pressure of the boiler. On a 200-hp. equipment it has been found to work very satisfactorily with a 5-hp. blower. This was a boiler outfit with four doors. The blower was fitted with two pipes, one running to each side of the boiler.

There also has been considerable experimenting done with mixing this low grade of anthracite coal with bituminous coal, and a mixture of four to one has been found to work fairly satisfactorily, providing the two grades are thoroughly mixed together.

In burning these different grades of coal other than the fireman is accustomed to handle, care should be taken to look out for the coal forming gases and blowing open the furnace doors, also emitting back flashes on opening the doors.

New York, Jan. 28. GEORGE BENDER.

CONTENTS

The Old-Time Iron Treasure Chest 309
The Industrial Disintegration of Russia 314
New Priority Rules 316
British Munitions Output Growing 316
Our Ferromanganese Output 316
New Static and Dynamic Balancing Machine 317
Roll Type of Pulverizing Machine 317
The Grinding Wheel in the Foundry 318
Cobalt High Speed Steel Not a German Discovery 321
Labor in Steel Works 322
Huge Metal-Planing Machines of Concrete 322
The Hanyang Steel Plant in 1916 322
Blast Preheater for Stoves 323
Domestic Magnesite in 1917 323
Housing Bill Passed 324
Why Water Power Developments Are Backward 324
New Storage Battery Truck and Tractor 325
Labor Turnover and the Disabled Workman 325
Handling Foundry Workers 326
Japan Plans to Do Without American Plates 327
Spelter Output in 1917 327
Universal Cylindrical Grinding Machine 327
Flywheel Design for Rolling Mills 328
Machine-Tool Controller Developments in 1917 330
Motor Trucks Increase California's Mineral Output 330
Safe Practices in the Open-Hearth 331
A New Motor-Driven Swing Saw 331
Patriotic Bonus Plan 331
Many Problems for the Shipping Board 332
Large Tin-Plate Exports and Their Destination 333
Rushing New Locomotives 333
Australia's First Electric Steel Plant 333
Editorial:
Future Government Buying of Steel 334
Germany's Outlook in Steel 334
Our Undeveloped White Coal 335
Criticism Not Faultfinding 335
Wanted—A Plan of Action 336
Correspondence 336
More "Advisory" Help in Buying for Army 338
War Service Committee 339
May Build Plate Mills in Canada 339
Iron and Steel Markets 340
New Plant to Make Gun Mounts 350
Iron and Industrial Stocks 350
Pittsburgh and Nearby Districts 351
Western Scrap Organization Formed 351
Iron Company Suffers Fire Loss 351
Daylight-Saving Bill 351
Metal Markets 352
Prices Finished Iron and Steel, f.o.b. Pittsburgh 353
Obituary 354
Immense Foreign Trade of the United States 354
Republic Company Buys Coal Property 354
Steel Corporation Earnings 355
Output of Chromite in 1917 355
Fixation of Nitrogen Now a Large German Industry 355
Personal 356
Big Jump in December Fabricated Business 357
Statistics of American Merchant Marine 357
Society for Ohio Safety Engineers 357
Cutting Down Production the Chief Aim 358
New Committee for Scrap 360
Striving for Greater Output of Ships on Coast 360
Boston Molders Strike 360
More Billions Needed 361
Draftsmen, Clerks and Others Needed by the Government 361
Brazilian Manganese Shipments Stopped 361
Eight-Hour Day for Railroad Labor 362
Many Plant Troubles 363
Ban on Tin Speculation in England 363
More Alloy Steel for British War Purposes 363
Export Licenses 364
Conditions Affecting Women Workers 364
Machinery Markets and News of the Works 364a

More "Advisory" Help in Buying for Army

War-Making Machinery Wound About with More Red Tape in the Appointment of E. R. Stettinius—Passing of War Industries Board

WASHINGTON, Jan. 29.—The program for speeding up the war machine, evolved by the Senate Committee on Military Affairs and including the creation of a war cabinet and a director of munitions, now hangs in the balance. The Senate will probably determine the fate of these measures during the present week. All the influence of the Administration will be thrown against them. Should they pass the Senate they must run the gauntlet of the House, in which the outcome is equally uncertain.

Giving the fullest weight to Secretary Baker's statements before the Senate committee on Monday, it cannot be said that they have served to modify the views of the committee as to the necessity for legislation co-ordinating the war work and centralizing authority in a small number of high officials devoting themselves exclusively to pushing military preparations with the utmost vigor. Leaving out of the account criticism of the department's failure to make the most of its opportunities, the bulk of the sentiment now crystallizing in favor of the cabinet council and munitions director bills is based upon the apparent unwillingness of the Administration to make a radical change in the war-making machinery so as to place in the hands of a few responsible officials powers and authority now scattered among a hundred whose hands are tied by endless folds of official red tape.

New Surveyor General Has No Authority

The appointment by Secretary of War Baker of Edward R. Stettinius of New York as surveyor general of all Army purchases, announced here Jan. 25, created nothing short of a sensation. It was everywhere regarded as an attempt on the part of Secretary Baker to forestall the proposed action of Congress to create the new office of director of munitions as provided in Senator Chamberlain's bill. In the Senate and House critics of the War Department organization declared the appointment would not prevent early action on the pending measure, and Senator Chamberlain stated very emphatically that Secretary Baker had merely confirmed the opinion in Congress as to the necessity for centralizing authority in the manufacture, procurement and distribution of war material, adding, however, that the situation had not been fully met and that he would continue to urge the authorization of a director of munitions, whose powers would be statutory and absolute and not dependent upon a mere executive order revocable at will.

In Secretary Baker's original announcement of Mr. Stettinius' appointment he gave the impression that the jurisdiction of the new surveyor general would be as comprehensive with respect to Army purchases as it has heretofore been with regard to those made for the Allied governments, for which he has been acting for more than three years. In this connection the Secretary said:

> Mr. Edward R. Stettinius of New York has been appointed surveyor general of all Army purchases. He will be in charge of the procurement and production of all supplies by the five Army bureaus, viz., ordnance, quartermaster, signal, engineer and medical. It will be his duty to co-ordinate such purchases and properly relate the same to industry, to the end that the Army program be developed under a comprehensive plan which will best utilize the resources of the country.
>
> From the outbreak of the war Mr. Stettinius has been in sole charge of the allied purchases in this country and has been responsible for the development of the production of war materials. His intimate knowledge of war conditions in Europe and in the United States, as related to industry, and the practical means he has used to accomplish his plans, pre-eminently qualify him for his position. Mr. Stettinius will assume his new duties at once and establish his office in Washington.

This statement concerning the scope of Mr. Stettinius' authority created a favorable impression at the outset as indicating that the Secretary of War had at last determined upon a policy of concentration and had selected a man of unquestioned ability for a great task. Later in the day, however. Mr. Baker qualified his original statement, declaring that the surveyor general is to have none of the functions of a director of munitions and, in fact, is to be an advisory official without a shred of executive authority. It was explained that he would be subordinate to Col. Palmer L. Pierce, the new director of purchases detailed for this service in accordance with the reorganization of the War Department, the outline of which was promulgated by Secretary Baker last week. Mr. Stettinius will review all orders for supplies, keeping in touch with the industrial situation, but will have no final authority. In illustrating the operation of the new purchasing plan, Secretary Baker said that if General Goethals, the newly appointed quartermaster general, desired to make a certain purchase an order would go to Colonel Pierce, who would refer it to Mr. Stettinius, who would survey the business field and consult with the War Industries Board and decide where the order should be placed. This recommendation would go back to Colonel Pierce for indorsement and by him would be transmitted to General Goethals, who would let the contract, provided that no disagreements had arisen among the officers handling the matter. In the event of failure to agree, the Secretary of War would be called in to act as referee.

Simply More Red Tape

When the fact is borne in mind that Mr. Stettinius has been exercising unrestricted authority in the annual expenditure of many billion dollars for the Allied governments, it is not surprising that officials and public men familiar with his work should express astonishment at his willingness to accept the post tendered him by the Secretary of War under the conditions outlined by Mr. Baker. Instead of eliminating red tape, cutting corners and reducing the complicated machinery of War Department purchasing, Secretary Baker has simply added another wheel to the machine, thereby increasing the probability of disagreement, controversy and delay. In addition, Mr. Stettinius' efficiency as general purchasing agent for the Allies, a post, it is understood, he will continue to hold, promises to be greatly reduced because of the time and attention he must devote to surveying the buying of the War Department.

An examination of the official chart showing the plan of reorganization of the War Department, submitted by Secretary Baker to the Senate Military Committee, discloses two highly significant facts; first, that the appointment of a surveyor general is an afterthought contemplated only since Senator Chamberlain introduced his bill creating a director of munitions, and, second, that the co-ordination of authority pro-

vided by the chart is a hopeless hodgepodge in which all considerations or military rank and discipline are totally ignored. The chart, which bears date of Jan. 9, sets out the scheme of five new divisions of the War Department, showing all important officers attached thereto, but no "surveyor general of purchases" or no one discharging similar functions appears in the list. The diagram also makes plain the astonishing fact that under the new system Colonel Pierce, the director of purchases, who is also a member of the War Industries Board, is placed in a superior position to five major generals who must report to and operate through a man of inferior rank. Colonel Pierce, under the new scheme of reorganization, is under, first, the War College; second, the General Staff; third, the Secretary of War, and, finally, the President. Mr. Stettinius, holding the position created as an afterthought, will serve as assistant to Colonel Pierce and will, therefore, be subordinate to half a dozen other authorities, including the War Industries Board, which at the present time is supposed to be exercising the exact function which is to be assigned to the new surveyor general of purchases, namely, the distribution and co-ordination of governmental buying.

Position of War Industries Board

Secretary Baker's latest step renews interest in the insistent question as to what is to become of the War Industries Board and the Council of National Defense. It is reported here as decidedly significant that President Wilson has not yet filled the vacancy in the chairmanship of the War Industries Board, which was created by Daniel Willard's resignation. Had Mr. Stettinius been appointed to this post the selection would have been very generally approved, although the radical element in Congress does not regard the Council of National Defense or any of its commissions and sub-committees as having sufficient authority to meet the grave crisis that has arisen in the conduct of the war. In making Colonel Pierce director of purchases, however, and especially in appointing Mr. Stettinius as surveyor general, the President has stripped the War Industries Board of its last reason to exist and an order abolishing it would surprise no experienced observer of Washington affairs.

The Council of National Defense, meaning the Cabinet officers who constitute its membership, is now a council in name only, and so far as is known its members hold no meetings except at the regular semi-weekly sessions of the full Cabinet at the White House. The advisory commission rarely meets and there appears to be no definite scheme for utilizing the ability or influence of its members. Several minor boards and sub-committees are doing commendable work, especially those on aircraft and auto-truck production and the commercial economy board, which is conducting general propaganda to carry home to the people at large the necessity for bringing their standards of living into harmony with weather conditions. Director Gifford and Secretary Clarkson of the advisory commission are handling an immense amount of detail very competently and it would be unfair to say that the commission is without important function, but it is, nevertheless, true that neither the Council of National Defense nor the advisory commission is clothed with any authority or is discharging any function related directly to the actual conduct of the war. W. L. C.

The Emergency Fleet Corporation has placed a contract with the Toledo Shipbuilding Co., Toledo, Ohio, for eight ocean steamers of 3550 dead weight net tons capacity. They will be 261 ft. long. Two are for next fall's delivery, and six for delivery in 1919. With this contract, the Toledo company has 14 steamers under order for salt water service.

WAR SERVICE COMMITTEE

American Foundrymen's Association Perfecting Plans for Helping Government

The War Service Committee of the American Foundrymen's Association has appointed C. E. Hoyt of Chicago secretary and has established offices in the National Union Building, 918 F Street, N.W., Washington. From these headquarters will be directed all of the committee's activities in connection with co-operation with the Government. Sub-committees on malleable and gray iron castings already have been named and a sub-committee on non-ferrous castings is being selected. A questionnaire has been prepared and will be mailed out to all of the foundrymen of the United States, and from the data thus obtained a survey of the foundry trade of this country will be made. Information is being sought on the melting equipment, capacity, fuel capacity, etc., of all castings plants, and when compiled this information will be available to all of the purchasing agents of the different Government buying departments.

R. A. Bull, Duquesne Steel Foundry Co., Pittsburgh, chairman of the American Foundrymen's War Service Committee and a major in the Officers' Reserve Corps, has resigned, having been called for active duty. He has been succeeded by H. D. Miles, vice-chairman, Buffalo Foundry & Machine Co., Buffalo.

The malleable and gray iron sub-committees already appointed are constituted as follows:

Malleable iron: Frank J. Lanahan, Fort Pitt Malleable Iron Co., Pittsburgh; H. F. Pope, National Malleable Castings Co., Cleveland; F. L. Sivyer, Northwestern Malleable Iron Co., Milwaukee; John E. Walker, Wilmington Malleable Iron Co., Wilmington, Del.; John C. Haswell, Dayton Malleable Iron Co., Dayton, Ohio, who also is a member of the general committee representing the malleable cast iron industry.

Gray iron: Henry A. Carpenter, General Fire Extinguisher Co., Providence, R. I.; W. D. Tynes, Hardie-Tynes Mfg. Co., Birmingham, Ala.; F. B. Whitlock, Interstate Foundry Co., Cleveland; W. P. Whelan, Western Foundry Co., Chicago.

May Build Plate Mills in Canada

TORONTO, ONT., Jan. 28.—The officials of the Nova Scotia Steel & Coal Co., New Glasgow, N. S., are participating along with the heads of other Canadian steel companies in negotiations with the Dominion Government relative to the establishing of rolling mills for steel plates for shipbuilding and generally speeding up the production of steel in Canada to meet the ever-increasing demand for these commodities. The plant extensions and improvements which are under way will put the company in a favorable position to take care of the increasing demand and will extend its output with decreased production costs.

The fire which affected the axle department of the Ontario Steel Products Co., Gananoque, Ont., will in no way interfere with the company's business, and operations will be resumed in the damaged section of the company's plant immediately. Work of reconstructing the damaged section has already begun.

The Railway Department of the Canadian Government will shortly place orders for $7,000,000 worth of new rolling stock. Contracts aggregating $4,000,000 for locomotives, cars, etc., were let some months ago, and deliveries are now being made. Parliament last session voted $25,000,000 for additional equipment for Canada's railways, and the contracts are now being placed as rapidly as the steel companies can handle them.

Fire on the night of Jan. 25, destroyed a large part of the shipbuilding plant of Henry Smith & Sons Co., Curtis Bay, Md. The blaze started in the main building and is believed to have been the work of an incendiary. The plant is doing Government work.

Iron and Steel Markets

TIE-UP GROWS WORSE

New Blockades at Middle Western Works

Scarcity of Low-Phosphorus Pig-Iron—Large Volume of Fabricated Work

Iron and steel works of Pennsylvania and all the Middle West are floundering in a snow blockade worse than any in the past two months of such visitations. The whole industry has been so demoralized by these repeated blows that there is today little trace of a normal aspect in markets or in plant operation. Embargoes in Pennsylvania have reduced some mills to utter helplessness.

Chicago is making painfully slow recovery from a nearly complete shutdown, with little hope of decided improvement apart from milder weather and an early spring. In western Pennsylvania, heavy snows on Monday paralyzed traffic, and it took more than 24 hours to dig out trains climbing over the Allegheny Mountains.

Pennsylvania and Central Western blast furnaces and steel works are operating at from 50 to 75 per cent of capacity, and there is little prospect of real relief while winter lasts. Blast furnaces get little coke, and what is delivered is so poor that more off iron than standard grades is made. At Connellsville coke ovens, 35 per cent car supply is about the average.

Fresh storms and cold have largely defeated the plans for breaking freight blockades, and at steel works piled-up stocks of finished product will impede operations for days, and in some cases weeks. The scarcity of cars to move product from the mills is thus fully as serious a factor as scarcity of coal and coke.

The chief gain from the shut-down order thus far has been in the coaling of vessels at Atlantic ports. A very promising start has been made in releasing the thousands of tons of steel and munitions waiting shipment to American and Allied armies.

War shipments make up 75 per cent of the current movement in the heavier finished steel lines. It has been surprising, in fact, on how small a part of the output the country has maintained its ordinary consumption in the past two months.

Pig-iron markets naturally have slowed down, as the business of delivering has absorbed every energy. That the low-phosphorus pig iron supply is short of the demand for the turning out of gun forgings and other war material calling for acid steel is one of the serious features of the situation. Low phosphorus ores from Chile, Spain and Sweden are cut off and the Lake Superior supply is very limited.

In ferromanganese there has been added to falling domestic production and much smaller imports a recent order stopping for 60 days the shipment of manganese ore to seaport over the Central Railway of Brazil, due to lack of fuel. However, after three years of alarms ferromanganese users are not easily thrown into a panic.

How large has been the volume of Government fabricated steel work, particularly for the fabricated ship program, is indicated by the 205,000 tons of bookings by bridge and structural shops in December, 14 per cent above rated capacity. Over one-third of last year's business was done in the last quarter. Two years ago a spurt due to plant extensions gave a total in December, 1915, of 208,500 tons, but general building was not heavily checked then as now.

About 45,000 tons of relatively light steel work is needed for 1500 buildings for the Signal Corps. For the Quartermaster's Department for buildings in the United States 3000 tons has been closed.

Upward of 500 tons of large machine bolts has sold at $15 per ton below the allowed level. Where demand upon certain manufacturing departments slackens, the old law of competition in price seems still to be working.

Following recent orders for 30,000 tons of sheets, the Government has just bought a total of 12,000 tons.

Little basis exists for reports that the cutting down of plate mill outputs has hampered shipyards. Previous deliveries in many cases had been far ahead of the current requirements of the builders, and in some instances the accumulations of ship steel at yards are heavy.

There is keen interest in the making up of a new Iron and Steel Institute committee on prices and practices in the old material trade. More drastic control is predicted, with the elimination of some of the rulings the trade has been disposed to make for itself in certain districts.

Pittsburgh

PITTSBURGH, Jan. 29—(*By Wire*).

It does seem that the elements are set absolutely against any betterment coming in the frightful railroad congestion, which has simply paralyzed the iron and steel business for nearly two months. There seems to be no doubt that the five-day shut-down order of Fuel Administrator Garfield would have helped the situation to some extent at least, but just at the time the order went into effect the Pittsburgh district and, in fact, nearly the entire country were visited by the worst snowstorms and blizzards of the winter. This made almost impossible the movement of coal and coke, and also of the hundreds of thousands of tons of finished steel products that have been piled up in warehouses for some weeks awaiting cars for shipment. However, in the middle of last week there was about a three-day thaw here and strong hopes were felt that some of the congestion would soon be relieved. This was not to be, as on Saturday and Sunday last the heaviest snowfall

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Jan. 30, 1918	Jan. 23, 1918	Dec. 31, 1917	Jan. 31, 1917
No. 2 X, Philadelphia...	$34.25	$34.25	$34.25	$30.50
No. 2, Valley furnace...	33.00	33.00	33.00	31.00
No. 2 Southern, Cinti....	35.90	35.90	35.90	26.90
No. 2, Birmingham, Ala..	33.00	33.00	33.00	24.00
No. 2, furnace, Chicago*..	33.00	33.00	33.00	30.00
Basic, del'd, eastern Pa..	33.75	33.75	33.75	30.00
Basic, Valley furnace....	33.00	33.00	33.00	30.00
Bessemer, Pittsburgh....	37.25	37.25	37.25	35.95
Malleable Bess., Ch'go*.	33.50	33.50	33.50	31.00
Gray forge, Pittsburgh..	32.75	32.75	32.75	29.95
L. S. charcoal, Chicago..	37.50	37.50	37.50	31.75

Rails, Billets, etc. Per Gross Ton:				
Bess. rails, heavy, at mill	$55.00	$55.00	....	$38.00
O.-h. rails, heavy, at mill	57.00	57.00	....	40.00
Bess. billets, Pittsburgh..	47.50	47.50	$47.50	65.00
O.-h. billets, Pittsburgh..	47.50	47.50	47.50	65.00
O.-h. sheet bars, P'gh....	51.00	51.00	51.00	65.00
Forging billets, base, P'gh	60.00	60.00	60.00	85.00
O.-h. billets, Phila.....	50.50	50.50	50.50	60.00
Wire rods, Pittsburgh....	57.00	57.00	57.00	75.00

Finished Iron and Steel, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia..	3.685	3.685	3.685	3.159
Iron bars, Pittsburgh....	3.50	3.50	3.50	3.25
Iron bars, Chicago.....	3.50	3.50	3.50	3.00
Steel bars, Pittsburgh....	2.90	2.90	2.90	3.25
Steel bars, New York...	3.095	3.095	3.095	3.419
Tank plates, Pittsburgh..	3.25	3.25	3.25	4.50
Tank plates, New York..	3.445	3.445	3.445	4.669
Beams, etc., Pittsburgh..	3.00	3.00	3.00	3.25
Beams, etc., New York..	3.195	3.195	3.195	3.419
Skelp, grooved steel, P'gh	2.90	2.90	2.90	2.85
Skelp, sheared steel, P'gh.	3.25	3.25	3.25	3.00
Steel hoops, Pittsburgh..	3.50	3.50	3.50	3.25

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

Sheets, Nails and Wire, Per Lb. to Large Buyers:	Jan. 30, 1918 Cents	Jan. 23, 1918 Cents	Dec. 31, 1917 Cents	Jan. 31, 1917 Cents
Sheets, black, No. 28, P'gh	5.00	5.00	5.00	4.50
Sheets, galv., No. 28, P'gh	6.25	6.25	6.25	6.25
Wire nails, Pittsburgh...	3.50	3.50	3.50	3.00
Cut nails, Pittsburgh....	4.00	4.00	4.00	3.50
Fence wire, base, P'gh..	3.25	3.25	3.25	2.95
Barb wire, galv., P'gh..	4.35	4.35	4.35	3.85

Old Material: Per Gross Ton:				
Carwheels, Chicago	$30.00	$30.00	$30.00	$18.50
Carwheels, Philadelphia.	30.00	30.00	30.00	20.50
Heavy steel scrap, P'gh.	30.00	30.00	30.00	22.00
Heavy steel scrap, Phila..	30.00	30.00	29.00	20.50
Heavy steel scrap, Ch'go.	30.00	30.00	30.00	21.00
No. 1 cast, Pittsburgh..	30.00	30.00	30.00	19.00
No. 1 cast, Philadelphia.	30.00	30.00	30.00	20.00
No. 1 cast, Ch'go (net ton)	26.00	26.00	25.50	15.50
No. 1 RR. wrot, Phila....	35.00	35.00	35.00	26.00
No. 1 RR. wrot, Ch'go (net)	31.25	31.25	31.25	23.50

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt...	$6.00	$6.00	$6.00	$8.50
Furnace coke, future....	6.00	6.00	6.00	6.00
Foundry coke, prompt...	7.00	7.00	7.00	10.00
Foundry coke, future....	7.00	7.00	7.00	7.00

Metals, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York..	23.50	23.50	23.50	33.00
Electrolytic copper, N. Y.	23.50	23.50	23.50	33.00
Spelter, St. Louis	7.62½	7.62½	7.62½	10.50
Spelter, New York.....	7.87½	7.87½	7.87½	10.75
Lead, St. Louis.....	6.85	6.85	6.35	8.00
Lead, New York.....	7.00	7.00	6.50	8.15
Tin, New York.....	85.00*	86.00*	85.50*	45.75
Antimony (Asiatic) N. Y.	14.00	14.00	14.75	23.00
Tin plate, 100-lb. box, P'gh.	$7.75	$7.75	$7.75	$7.00

*Nominal

of the season occurred here and the railroad situation was again thrown back and is now worse than at any time since the railroads commenced to get tied up. On Monday, this week, the Pennsylvania Railroad East was practically out of business, that road refusing to sell tickets East beyond Johnstown. It is said that snow is piled up in the mountains 12 ft. high and that movement of freight and passengers east and west may be practically tied up for the remainder of this week. Business men who left New York Sunday night for Pittsburgh and were due here Monday morning did not arrive here until late Tuesday afternoon, in spite of the efforts made by the railroad to get its lines open. So far the only gleam of light to be seen is the fact that the Baltimore & Ohio Railroad has declared off an embargo west, and this will probably help manufacturing plants located along its lines in this city in making western shipments. The Pennsylvania Railroad is not showing any signs of taking off its embargoes east and west, and this action will no doubt be longer delayed on account of its lines being closed in the mountains because of the heavy snow drifts. In the meantime operating conditions in the steel trade, in the Pittsburgh district at least, are getting steadily worse. Reports to THE IRON AGE have come from probably a dozen manufacturing plants that were able to run to possibly 50 per cent of capacity last week, but this week are almost idle. Their warehouses are piled full of their products and the only recourse is to shut down and await the receipt of cars. Not more than half the blast furnaces in the Pittsburgh district are in operation. The Carnegie Steel Co. still has about 25 blast furnaces in the Pittsburgh and Valley districts down for lack of coke, while its steel operations are on a not over 50 per cent basis. Nearly all the large steel companies have either closed their plants this week or else are running very light, closing departments whose products can best be spared. The situation is deplorable, but seems to be without a remedy so long as the heavy snows and cold weather last. Local traffic conditions are fully as bad. Two leading railroads have issued notices of a change in schedules early in February, and it is their intention to take off more through and accommodation trains in an effort to get freight traffic moved. The steel trade, as far as new business goes, is practically at a standstill. Leading steel companies say that under present railroad conditions they do not care to take on new business, and are giving their united efforts to trying to obtain cars and get products manufactured and piled in warehouses moved to their customers. The local coal situation is slightly better, but is still very unsatisfactory. Plenty of coal is being mined in the Pittsburgh district, but there are no cars in which to move it. Probably a dozen large plants along the Monongahela River that ordinarily bring their coal down in barges are either shut down tight or else only partly running, as that river is frozen over solid and nothing can be moved on it. The movement of coke is still very slow and is not likely to get better until there has been a genuine thaw and trains can be moved with some regularity. The Government is placing 75 per cent or more of the new steel business that is being booked by the mills and other buying is extremely light. The question is asked, What would become of the steel business if the war would suddenly stop? The general answer is that it would be more or less demoralized, as general consumers are not buying 25 per cent of what the mills could turn out. So long as the war lasts the steel mills seem assured of all the business they can handle, but it is surprising with how little steel the non-war trade has been getting along for the past two months or more.

Pig Iron.—The acute shortage in pig iron is getting steadily worse, as the blast furnaces are not making any progress in getting on a larger rate of operation, and, if anything, they are losing ground in this respect. It is not believed that the Pittsburgh and Valley districts are making more than 50 per cent of the normal output of pig iron, and much of this iron is below the regular standard of quality, due to inferior coke which the furnaces must take in, or do without entirely. Blast furnaces are piling iron rapidly, as they cannot get cars in which to ship it. Very few sales of pig iron are being made in this district, as furnaces are not

anxious to sell for delivery in second quarter, on account of the uncertainty of the prices of pig iron after April 1. There is some fairly heavy inquiry for basic iron, but where this is to come from is a question. One local steel company that has blast furnace affiliations has an inquiry out for 5000 tons of basic iron per month from February over the remainder of the year. A Youngstown, Ohio, steel interest that also has its own blast furnaces has an inquiry out for any quantity of basic iron and for delivery over first half of this year. Local dealers and merchant furnaces say they are not quoting on these inquiries, as they have not the iron to ship. There have been some fairly large sales of foundry iron for second-half delivery, these sales having been made subject to Government prices ruling at time of delivery. We note sales of 8000 to 10,000 tons of No. 2 foundry for last half delivery at the regular price of $33, Valley furnace; also 2000 tons of malleable Bessemer for this quarter at $33.50, Valley furnace. The Westinghouse Electric & Mfg. Co. recently bought in this district 5000 tons or more of Bessemer iron for delivery at its Cleveland plants, to be used in the manufacture of war materials. This iron went at the regular price of $36.30, Valley furnace. It is very evident that more pig iron has been sold in other districts for second half of the year delivery than in this district. Output of pig iron in January will certainly show a large falling off as compared with December, and output in that month was unusually light, due to the shortage in coke.

We quote as follows: Basic pig iron, $33; Bessemer, $36.30; gray forge, $32; No. 2 foundry, $33; No. 3 foundry, $32.50, and malleable Bessemer, $33.50, all per gross ton at Valley furnace, the freight rate for delivery in the Cleveland and Pittsburgh districts being 95c. per ton.

Billets and Sheet Bars.—Operating conditions in semi-finished steel mills are fully as bad as in pig iron. The steel mills cannot get enough pig iron, their coal supply is short, and this is resulting in nearly all plants running at not more than 50 per cent of normal. Deliveries of billets and sheet bars on contracts are very slow and are getting worse. Some of the larger sheet and tin plate mills report they have only two or three days' supply of steel ahead, and unless it keeps coming in they will be compelled to shut down. In the Youngstown district one leading steel interest is giving the Government close to 100 per cent of its output, another 75 per cent or more and the third probably 50 per cent. These concerns find it difficult to reserve enough steel to supply their finishing mills and very often have to close down mills, waiting for steel. It is impossible to buy any steel in the open market in the form of billets or sheet bars, as the mills, instead of being sellers of steel, would be eager purchasers, if the steel could be had. The outlook for any increase in output of steel for some little time is certainly not very bright.

We quote 4 x 4 in. soft Bessemer and open-hearth billlets at $47.50, sheet bars $51, forging ingots $73, and forging billets $60 base, all f.o.b. at mill, Pittsburgh or Youngstown.

Steel Rails.—Some fair sized sales of standard sections are being made by a mill that has a limited tonnage to spare for fairly prompt delivery. This maker is quoting from $60 to $65 on Bessemer standard sections and on open hearth $63 to $65, at mill. Most of the new business is light rails going to the rerolling mills. The Government price on light rails, rolled from billets, is $3 per 100 lb. for sections from 25-lb. to 45-lb., at mill.

Ferroalloys.—About two weeks ago, prices on 80 per cent domestic ferromanganese were weak, and several local dealers quoted on inquiries as low as $240 delivered. However, the railroad congestion has made movement of this material very slow, and it is scarce for prompt delivery. Sales were made in the past week of probably 200 tons of 80 per cent ferromanganese at $250 delivered, and the market is firm at this price. A Wheeling, W. Va., interest has an inquiry out for 1000 tons of 50 per cent ferrosilicon, but has not yet closed. This material is higher in price and is now firm at $175 to $180 per ton, delivered. Prices on 18 to 22 per cent spiegeleisen range from $65 to $70, delivered. One consumer recently bought about 100 tons at the lower price. Makers of Bessemer ferrosilicon of the lower grades are sold up over first quarter, and say they are not seeking new business for second quarter, owing to the uncertainty as to price after April 1. We quote 80 per cent domestic ferromanganese firm at $250, delivered; 18 to 22 per cent spiegeleisen at $65 to $70, delivered, and 50 per cent ferrosilicon at $175 to $180, delivered.

We now quote 9 per cent Bessemer ferrosilicon at $54, 10 per cent $55, 11 per cent $58.30, 12 per cent $61.60. We quote 6 per cent silvery iron $40, 7 per cent $42, 8 per cent $44.50, 9 per cent $47, 10 per cent $50. Three dollars per gross ton advance for each 1 per cent silicon for 11 per cent and over. All the above prices are f.o.b. maker's furnace, Jackson or New Straitsville, Ohio, these furnaces having a uniform freight rate of $2 per gross ton, for delivery in the Pittsburgh district.

Structural Material.—Local fabricators state that practically no new commercial work is coming out, nearly all the new business being placed coming from the Government. The McClintic-Marshall Co. recently took about 2800 tons of eastern Government work, and has also taken a piershed for the barge canal in New York, about 400 tons. Structural fabricators say deliveries of plain material by the mills are very bad, and also that they cannot get cars to move fabricated material. This is making the erection of new work very slow, and early relief is not in sight. Railroads are not placing any orders for structural work, except for small jobs that must be built. We quote beams and channels up to 15-in. at 3c., at mill.

Plates.—Local steel car builders say they have no intimation about the reported Government order for 4500 cars of various types for shipment to France. Recently local builders bid on about 900 small cars for France, but nothing has been heard of the order. The Pressed Steel Car Co. has taken 50 steel gondolas for the Republic Iron & Steel Co., 30 steel hoppers for the New Jersey Zinc Co. and 12 steel hoppers for the Northwestern Iron Co. The supply of plates from the smaller mills for fairly prompt delivery is being steadily reduced by the light operation of the plate mills, due to shortage in steel. Several mills that were fairly free sellers announce that they have all the business they can take care of for the next two or three months, unless their rate of output soon materially increases. Local steel car companies are finishing old contracts for cars, but most of their operations are on war materials for the Government. We quote ¼-in. and heavier sheared plates at 3.25c., at mill, Pittsburgh.

Sheets.—The new demand for sheets from the commercial trade is only fairly active, but the Government demand is very heavy. In addition to the 30,000 tons placed by the Government recently and divided among the mills, it is stated that 12,000 tons more came out in the past week, with other large orders in prospect. A good part of the sheets being bought by the Government is going to France to be used in war buildings being erected in that country. The output of sheets at present is not over 50 per cent of normal, and may be at a less rate. Some sheet mills are down entirely for lack of steel and coal and others are running only about half of their hot mills. Mills have not yet started to sell freely for second quarter delivery on galvanized sheets, but on Bessemer black and blue annealed are pretty well filled up for second half of this year. Mills that still have some sheets to sell for second quarter delivery are not anxious to take orders owing to the uncertainty as to prices after April 1, and consumers who have not covered for second quarter are holding off placing their business for the same reason. Regular prices, as fixed by the Government, on sheets are given on page 353.

Tin Plate.—When the shortage in steel and coal is considered, operations of the tin plate mills are on a fairly satisfactory basis, being probably 90 per cent of the average. However, cars cannot be secured to make shipments, and some of the larger tin plate mills are about at the end of their string on warehouse facilities, and will soon have to shut down unless they are able to get cars. One leading mill is said to have all its warehouses piled full of tin plate, and has closed one or two of its mills that had no more storage room. The scarcity in supply of sheet bars is growing worse, and output of tin plate is likely to be on a reduced scale before long. There is a good deal of export inquiry, but owing to scarcity of cars and also of bot-

toms, and the trouble in getting Government permits, very little export business is being booked by the mills. We quote tin plate in large and small lots at $7.75 per base box at mill, rolled from Bessemer or open-hearth stock. Prices on terne plate are given on page 353.

Iron and Steel Bars.—The new demand for steel bars is much heavier, and recently some of the larger implement makers have sent in specifications for early requirements and at a heavier rate than expected, this indicating a large consumption of steel bars this season and also a large output of farming implements. The general demand for iron or steel bars from commercial consumers is heavy and mills are filled up over the next three or four months. Output is restricted very much, due to the scarcity of steel and fuel, some of the iron and steel bar mills are not operating to more than about 50 per cent of capacity. We quote steel bars, rolled from old steel rails, at 3c.; from steel billets, 2.90c., and refined iron bars, 3.50c., f.o.b. mill, Pittsburgh.

Rods.—There is a continued active domestic and export demand for more rods, with an acute shortage in the supply. Some mills rolling rods are not turning out more than 50 per cent of normal output, due to shortage in steel and also to the fact that they do not regard steel rods at $57 as attractive material to roll, claiming the margin of profit is very small. Some fairly large orders for soft rods are going to the Orient by way of the coast, for which higher prices are obtained than for domestic rods. Prices on rods are given in detail on page 353.

Wire Products.—Mills report that the new demand for wire and wire nails is more active, and, considering the present unsatisfactory conditions, is heavier than they expected. It is said that last week the Government placed with the different mills a contract for about 20,000 kegs of wire nails, about half of which was taken by the leading interest. There is also a fairly heavy inquiry for wire nails from the Panama Canal, on which local mills have quoted the regular Government price of $3.50 base per keg, and on which they were required to file bond. The output of wire and wire nails is very much restricted, owing to shortage of steel and coal, and shipments are light, as cars cannot be obtained. One leading mill has shut down its wire department until the situation is relieved. Prices on wire products are given in detail on page 353.

Nuts and Bolts.—Makers continue to report the commercial demand for nuts and bolts as very light, and say that fully 90 per cent or more of the new business being placed is coming from the Government. It is claimed that the Government has placed within the past month orders for over 6,000,000 bolts, but this cannot be officially confirmed, as makers refuse to discuss Government contracts. Makers are not disposed to sell for delivery beyond April 1, owing to the uncertainty as to prices, and consumers are holding off placing orders for the same reason. Regular discounts on nuts and bolts are given on page 353.

Rivets.—The general demand is not taking more than 15 to 20 per cent. of the output of rivets, the Government placing 75 per cent or more of all the new business, and has been doing so for some time. On boiler rivets makers report they are sold up for three or four months, but the demand for structural rivets is not nearly so urgent. We quote structural rivets at $4.65 and cone-head boiler rivets at $4.75 per 100 lb. f.o.b. Pittsburgh.

Hoops and Bands.—Mills report the commercial demand for hoops and bands as only fair, but most consumers are covered on contracts over this quarter and some for first half of the year. Output of hoops and bands is probably not over 50 per cent of normal, one leading mill having been closed all last week on account of shortage of steel. We quote steel hoops at 3.50c. and steel bands at 2.90c., extras on the latter as per the steel bar card, f.o.b. Pittsburgh.

Shafting.—The Government demand continues very heavy, taking 75 per cent or more of the output, but the commercial demand is very dull, especially from the automobile trade, and has been for the past two months or more. Output of shafting is cut down very much on account of shortage of steel and coal, some makers not turning out more than 50 per cent of normal output. We quote cold-rolled shafting in large or small lots at 17 per cent off list, f.o.b. Pittsburgh.

Cold-Rolled Strip Steel.—The commercial demand is dull, but makers state the Government is still a heavy buyer. Shortage in steel and also in cars is making operations very unsatisfactory. One leading maker reports it has over 2000 tons of cold-rolled strip steel piled up in its warehouses awaiting cars, and another mill has a larger quantity. This latter mill is closed this week, not desiring to increase its already heavy stocks. Makers are not disposed to sell for delivery beyond March 31, owing to the uncertainty of the market after that date, and buyers are also holding off, to some extent, placing new orders.

We quote cold-rolled strip steel at $6.50 per 100 lb., f.o.b. Pittsburgh, terms 30 days, less 2 per cent for cash in 10 days, when sold in quantities of 300 lb. or more.

Hot-Rolled Strip Steel.—Makers report the demand fairly heavy, but are not selling for delivery beyond March 31. The price of hot-rolled strip steel is reported firm at $4.50 per 100 lb., f.o.b. Pittsburgh.

Spikes.—The new demand for railroad spikes is dull, but for boat spikes is very heavy and makers are sold up for some months ahead.

We quote standard sizes of railroad spikes, 9/16 x 4½ in. and larger, at $3.90 per 100 lb. in lots of 200 kegs of 200 lb. each, or in larger lots. Boat spikes are held at $5.25 per 100 lb., f.o.b. Pittsburgh.

Wrought Pipe.—The coal and steel shortages and also inability to get cars, are cutting down output of pipe to probably less than 50 per cent of normal. Two large mills in this district have been closed for several weeks, unable to get coal. Some large inquiries for line pipe are coming out, one for about 200 miles of 8-in. for delivery during the spring and early summer to the Calgary district in British Columbia, and another for about 150 miles of 6-in. for delivery in Oklahoma. It is expected that the building of new gas and oil lines this year will be very active, and mills are expecting that some heavy contracts will be placed. Probably less of the output of the pipe mills is now going to the Government than on any other single line of manufacture. The merchant demand for tubular goods is only fair, but mills are sold up for months and the obligations of the leading interest are so heavy that the entire output for this year is practically under contract. Discounts on iron and steel pipe are given on page 353.

Boiler Tubes.—The heavy loss in output of tubes on account of the shortage in steel and fuel is putting the mills further behind in deliveries and several of the larger makers say that almost their entire output for this year is under contract, basing this on their present light rate of operation. The Government is still placing very heavy orders for iron and steel tubes, and efforts of the mills to make quick deliveries on these cannot be carried out on account of the shortage in cars and the railroad congestion. Discounts on iron and steel tubes are given on page 353.

Coke.—There is absolutely no betterment in operating conditions in the coke trade, and the situation seems to be worse than at any time. Many coke plants are not operating to more than 50 per cent of capacity, as their yards are piled full of coke and they are compelled to shut down while waiting for cars to move it. Last week the average supply of cars was not over 35 per cent, at some plants less, and it does not promise to be any better this week. There is much complaint from blast furnaces over the poor quality of coke they are receiving, but operators say they cannot help this, as they are doing the best they can under the most trying conditions they have ever experienced. Sales of prompt coke are light, as operations are such that no surplus coke is being made. We quote blast furnace coke at $6; 72-hr. foundry at $7, and crushed coke in 1-in. size at $7.30, all in net tons at ovens. The *Connelsville Courier* gives the output of coke in the upper

and lower Connellsville regions for the week ending Jan. 19 as 238,425 tons, an increase over the previous week of 718 tons.

Old Material.—There is no improvement whatever in the unsatisfactory conditions in the local scrap trade that have ruled for several months. Dealers say it is almost useless to try to do business under present railroad conditions. They claim that very often, when they secure a railroad permit for the shipment of scrap, the time allowed in the permit expires before the cars can be obtained, and then they must try to get another, often without success. It is an absolute fact that on less than a 75-mile haul some cars of scrap have been on the road for over 60 days and are not yet delivered. There is a heavy demand for nearly all grades of scrap, especially for heavy melting steel, low phosphorus scrap, borings and turnings. In fact, there would not be the slightest trouble for dealers to sell all the scrap they could get at full Government prices with the full 3½ per cent. commission allowed, but they cannot get the cars to move the material, and in addition, the available supply of scrap of all kinds is very light, and has been for some time. It is said one leading consumer is refusing to pay any commission to dealers on its purchases of scrap. Several of the largest scrap dealers in this city report they are not making any effort to do business under the present unsatisfactory conditions, nor will they do so until the railroad congestion is largely relieved.

Prices on iron and steel scrap for delivery in the Pittsburgh and other districts that take Pittsburgh freight are as follows:

Heavy steel melting scrap, Stuebenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh, delivered	$30.00
No. 1 foundry cast	30.00
Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., Franklin, Pa., and Pittsburgh	35.00
Hydraulic compressed sheet scrap	$26.00 to 27.00
Bundled sheet scrap, sides and ends, f.o.b. consumers' mill, Pittsburgh district	24.00 to 25.00
Bundled sheet stamping scrap	22.00 to 23.00
No. 1 railroad malleable stock	30.00
Railroad grate bars	19.00 to 20.00
Low phosphorus melting stock	40.00
Iron car axles	47.50
Steel car axles	47.50
Locomotive axles, steel	47.50
No. 1 busheling scrap	27.00 to 28.00
Machine shop turnings	20.00
Cast iron wheels	30.00
Rolled steel wheels	35.00 to 37.00
*Sheet bar crop ends	39.00 to 40.00
Cast iron borings	20.00
No. 1 railroad wrought scrap	35.00
Heavy steel axle turnings	25.00 to 26.00
Heavy breakable cast scrap	30.00

*Shipping point.

Chicago

CHICAGO, Jan. 29—(*By Wire*).

Painfully slow recovery is being made from the blight which was cast on the iron and steel industry by storms, transportation difficulties and the edict of the Fuel Administration. The one great hope is for milder weather and an early spring. All the steel mills lack coal and operations are not much over 60 per cent in any case. Coal en route to the leading local independent has been confiscated, despite the mills' exemption from the fuel order so far as Government work is concerned. The fuel authorities also appropriated 51 cars consigned to an iron and steel bar manufacturer. Lack of coal prevented the East Chicago plant of the Interstate Iron & Steel Co. from starting to-day, and other mills which started see shut-downs imminent. With the Illinois Steel Co. operations are slowly improving. To-day it placed in operation its converter plant, also billet and rod mills at Joliet, operations which will enable the resumption to-morrow of the Joliet wire plant of the American Steel & Wire Co. The start is made in a small way as only one blast furnace is operating at that place. At South Works four furnaces are in blast and at Gary six. Furnace B of the Federal Furnace Co. is making iron after being banked four or five days. Shipments of pig iron are behind and moving slowly, several melters being at the verge of shutting down. With coke the situation is still worse, cars of any sort being almost unobtainable, especially for shipment outside of the Chicago switching district. Pig iron has been placed in large quantity for last-half delivery. Sellers have agreed on a form of price revision clause. There are fewer sellers of steel in any form; sheets are difficult to procure, as demand exceeds the production. Higher prices are predicted for ferromanganese, with a lessened ore supply in sight.

Pig Iron.—All important producers are selling for last half delivery and a heavy business has been done in that position. Despite the fact that inquiry is not general, the makers can dispose of as much of their product as they like, since it has been unanimously determined to incorporate in contracts a more or less uniform clause stipulating that prices are subject to Government revision after March 31. The generally adopted clause reads: "The prices to be paid by the purchaser for any of the materials named herein, which are shipped under this contract after March 31, 1918, shall be the price fixed for that time by proper United States Government agency by agreement or otherwise, as the public or market price for such material instead of the price herein named." With the inclusion of this clause it is the experience of iron sellers that the only effort required to dispose of iron is the offering. They are not doing this in a hit or miss manner, but are apportioning iron as their judgment deems best. Bad weather and bad transportation have seriously halted deliveries, but while many foundries are on the verge of shutting down because of lack of raw material, very few have been forced to this extremity. For several days not a pound of iron could be moved because of snow, and while tracks are in better condition, the problem of getting cars is just as great. A Southern furnace which has been selling with both a revision and a cancellation clause in contracts has taken business in the fourth quarter, and is about through. Another Southern company has a complete line of foundry iron for the last half, some for the second quarter, and very few grades for the first quarter. The silveries are unobtainable. All prices are unchanged as fixed by the Government. The following quotations are for iron delivered at consumers' yards, except those for Northern foundry, malleable Bessemer and basic irons, which are f.o.b. furnace, and do not include a switching charge averaging 50c. per ton:

Lake Superior charcoal, Nos. 2 to 5	$37.50
Lake Superior charcoal, No. 6 and Scotch	40.00
Northern coke foundry, No. 1	33.50
Northern coke foundry, No. 2	33.00
Northern coke foundry, No. 3	32.50
Northern high-phosphorus foundry	33.00
Southern coke No. 1 foundry and No. 1 soft	38.50
Southern coke No. 2 foundry	37.00
Malleable Bessemer	33.50
Basic	33.00
Low phosphorus (copper free)	53.00
Silvery, 7 per cent	44.54

Ferroalloys.—Eighty per cent ferromanganese is strong at $250, delivered. Advances are predicted in view of cabled information that coal shortages will cut down rail deliveries of manganese ore to Rio Janeiro, Brazil, about 50 per cent. Coupled with this is an inadequate number of vessels to bring ore to the United States.

Plates.—With limited production largely devoted to Government needs the situation is tighter than ever. An Ohio maker continues to offer limited quantities of plates under 72-in. in width, but an Eastern maker will not consider business at all. The leading independent will not sell beyond the first quarter and is filled for the period, especially so in view of its reduced production. The mill quotation is 3.25c. Jobbers quote 4.45c.

Structural Materials.—No car business is reported, in either new inquiry or contracts placed. The Chicago fabricators have very little domestic work ahead on their books, but some want to buy a little material. Fabricators in Milwaukee and St. Louis are fairly busy, in some instances with plant extension work. Several local shops fortunately have ship work. The Kansas City Structural Steel Co. will supply 14 tanks, requiring 330 tons, for the United States Stores Co., Laredo, Tex. The mill price is 3c. Jobbers quote 4.20c.

Bars.—The situation in mild steel bars is much the

same as that in shapes. It is not easy to find an avowed seller, although effort would be made to care for a regular customer. The mill quotation is 2.90c. Makers of rail carbon and common iron bars, not being exempted from the fuel order, and suffering as much as others from storm blockades, have been hard hit. The Interstate Iron & Steel Co. did not start its East Chicago plant to-day because of coal shortage. The demand for iron bars is only fair, at best, at 3.50c., Chicago. Rail carbon bars are very quiet at 3c. plus extras. Warehouse prices are unchanged, as follows:

Soft steel bars, 4.10c.; bar iron, 4.10c.; reinforcing bars, 4.10c., base, with 5c. extra for twisting sizes ½ in. and over and usual card extras for smaller sizes; shafting, list plus 10 per cent.

Wire Products.—The demand is greater than the mills can care for with their reduced production. The plant of the leading interest at Joliet will resume to-morrow after a shut-down of several days. It has been a case of not having steel or coal or both. To these difficulties has been added the difficulty of finding cars to ship what finished material was in stock. We quote prices at Government levels as follows:

Nails, $3.50, Pittsburgh; plain fence wire, $3.25; painted barb wire, $3.65; galvanized barb wire, $4.35; polished staples, $3.65, and galvanized staples, $4.35.

Rails and Track Supplies.—Inquiries for rails, both light and standard section, in small lots have resulted in business, several thousand tons having been booked in the week, delivery to be at mills' convenience. Prices follow:

Standard railroad spikes, 4.11½c., Chicago. Track bolts, with square nuts, 5.11½c., Chicago. Tie plates, 3.25c., f.o.b. maker's mill. The base for light rails is 3c., f.o.b. maker's mill for 25 to 45-lb. sections, lighter sections taking Government extras.

Sheets.—This product, especially black and galvanized, is more difficult to procure. A mill which has been selling rather freely now requires its agent to submit all inquiries on these grades. Blue annealed, while not as easy, are still quoted. Light gages are in heaviest demand. It is unquestioned that the recent enforced shut-downs and those to come will cause a shortage that will be reflected in the market. The leading local independent maker is not quoting, being filled for the first quarter, and unwilling to sell beyond. We quote No. 10 blue annealed at 4.25c.; No. 28 black at 5c., and No. 28 galvanized at 6.25c. Warehouse prices are unchanged at official levels.

We quote for Chicago delivery out of stock, regardless of quantity, as follows: No. 10 blue annealed, 5.45c.; No. 28 black, 6.45c., and No. 28 galvanized, 7.70c.

Cast-Iron Pipe.—Bids will be opened Jan. 31, at Akron, Ohio, on 900 tons, and one or two other lettings are in prospect.

Quotations per net ton, Chicago, are as follows: Water pipe, 4-in., $57.30; 6-in. and larger, $54.30, with $1 extra for Class A water pipe and gas pipe.

Bolts and Nuts.—The makers are in a predicament because of their inability to obtain wire rods and other material with which to manufacture. Meanwhile there is a cessation of buying. For prices and freight rates see finished iron and steel f.o.b. Pittsburgh, page 353. Jobbers quote as follows:

Structural rivets, 5.50c.; boiler rivets, 5.60c.; machine bolts up to ⅞ x 4 in., 40 and 10 per cent off; larger sizes, 35 and 5 off; carriage bolts up to ⅞ x 6 in., 40 and 2½ off; larger sizes, 30 and 5 off; hot pressed nuts, square tapped, $1.05 off, and hexagon tapped, 85c. off per 100 lb.; coach or lag screws, gimlet points, square heads, 50 per cent off.

Old Material.—The mills appear to have plenty of scrap to meet current needs under present restricted operations, and in view of car shortages and embargoes it is well they have. There is an under-current of demand, but it has resulted in very little business. Brokers are not entirely agreed as to the application of the recently announced price schedule to some items in the list, some asserting that there are items whose price was not regulated. Old steel rails, less than 3 ft., is one of these, opinions putting the value at from $33, minimum, to $35, maximum. A producing seller says he would not think of asking over $33, while a broker says he has obtained $34 and upward. Another brokerage firm, an executive of which had to do with official price fixing, quotes $34 to $35. There is the same difference over iron axles, some holding that the recent ruling does not apply and that they can properly be quoted at $47 to $48 per net ton, instead of at $42.42 per net ton, the price of steel axles. The Chicago, Milwaukee & St. Paul Railroad is closing on a small list to-day, and the Big Four has a list of fair size before the trade. We quote for delivery in buyers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

	Per Gross Ton	
Old iron rails	$38.00 to	$39.00
Relaying rails		60.00
Old carwheels		30.00
Old steel rails, rerolling		35.00
Old steel rails, less than 3 ft	34.00 to	35.00
Heavy melting steel		30.00
Heavy melting steel, cut short lengths		33.00
Frogs, switches and guards, cut apart		30.00
Shoveling steel		30.00
Steel axle turnings	25.00 to	26.00
	Per Net Ton	
Iron angles and splice bars	$37.00 to	$38.00
Iron arch bars and transoms	39.00 to	40.00
Steel angle bars	28.00 to	29.00
Iron car axles	47.00 to	48.00
Steel car axles		42.42
No. 1 railroad wrought		31.25
No. 2 railroad wrought	30.00 to	30.50
Cut forge	30.50 to	31.00
Pipes and flues	24.00 to	24.50
No. 1 busheling	25.50 to	26.50
No. 2 busheling	18.00 to	19.00
Steel knuckles and couplers	33.50 to	34.50
Coil springs		37.00
No. 1 boilers, cut to sheets and rings	22.00 to	23.00
Boiler punchings	32.00 to	33.00
Locomotive tires, smooth	36.50 to	37.50
Machine-shop turnings	16.50 to	17.00
Cast borings	16.50 to	17.00
No. 1 cast scrap	26.00 to	26.75
Stove plate and light cast scrap	21.50 to	22.50
Grate bars	21.50 to	22.50
Brake shoes	24.00 to	25.00
Railroad malleable		26.80
Agricultural malleable	25.00 to	26.00
Country mixed scrap	21.50 to	22.50

Philadelphia

PHILADELPHIA, Jan. 29.

Just as there were signs of improvement in the traffic congestion, another snowstorm came on Monday and crippled transportation in the East, particularly in Pennsylvania. Serious tie-ups occurred on the Pennsylvania and Reading railroads, resulting in the annulment of many passenger trains. Snow drifts from 15 to 18 ft. deep tied up trains in the mountains in the western part of the State. The drastic embargoes in effect on the Pennsylvania and other Eastern roads have made it almost impossible for steel mills and blast furnaces to move their products, and storage facilities are greatly congested. Mills and furnaces continue to suffer from lack of coal and coke.

Pig Iron.—There have been sales of small lots of off-grade pig iron in the past week, aggregating, perhaps, a few thousand tons. A considerable part of this iron was high silicon. Several iron consumers whose plants are located on railroads not affected by embargoes have succeeded in obtaining shipments of iron from furnaces, which were not able to ship to contract customers. A majority of consumers, however, are not receiving any shipments at all as a result of the railroad embargoes and unless the situation is relieved soon, serious shortages will develop in many quarters. An eastern furnace, which has been selling for delivery in the second half, has disposed of all of the iron it cares to contract for at this time. It sold about 9000 tons of foundry and malleable iron last week. Other sellers show no disposition to contract for delivery beyond March 31. They believe that it is not good business policy to sell iron when they do not know what the price is to be. We quote the following standard grades at furnace, with the exception of Virginia iron, on which the delivered price in this district is quoted.

Eastern Pennsylvania No. 1 X	$34.50
Eastern Pennsylvania No. 2 X	33.50
Eastern Pennsylvania No. 2 foundry	33.00
Virginia No. 2 X (including freight)	36.77
Virginia No. 2 foundry (including freight)	36.27
Basic	33.00
Gray forge	32.00
Bessemer	36.30
Standard low phosphorus	53.00
Low phosphorus (copper bearing)	50.00

Coke.—There are numerous inquiries for coke for the second half. There is very little selling, however. Deliveries of coke to blast furnaces show no improvement and a number of nearby furnaces which have

banked recently have not as yet been able to resume operations.

Ferroalloys.—A better inquiry for ferromanganese has developed within the past week, but the market is by no means active. A sale of about 400 tons for delivery at a Portsmouth, Ohio, steel mill was made at $250, delivered. Reports of shading of this price have been heard but cannot be confirmed. The Brazilian ore situation again becomes threatening, this time through the action of the Brazilian Government in notifying American importers that no more manganese ore can be moved to seaboard in Brazil because of lack of sufficient coal. So far as the immediate future supply of ferromanganese is concerned, the situation is not alarming, but if stoppage of ore imports should last for any great length of time, it would prove serious. Spiegeleisen is quoted at $60, furnace. Demand is light.

Finished Iron and Steel.—The Signal Corps of the United States Army has received bids on the fabrication of 500 portable hangars for use in France, each containing 36 tons, a total of 18,000 tons. It is reported that the entire order is to be awarded to the Belmont Iron Works, Philadelphia. The Ordnance Department of the Army has received bids on eight ordnance storage buildings, each containing about 425 tons. The award has not been made. It is reported that an award of 500 more portable hangars will be made very soon. Other structural lettings are small and mostly for Government purposes. The Emergency Fleet Corporation has sent out additional specifications for ship plates, an eastern Pennsylvania mill having received an order for 20,000 tons. Production of plates is showing a marked falling off as a result of coal shortage. The Lukens Steel Co. last week rolled 3800 tons of plates out of a capacity of 6000 tons. New business in iron and steel bars and sheets is practically nil. We quote shapes at 3c., plates at 3.25c., soft steel bars at 2.90c., Pittsburgh, and bar iron at 3.50c., f.o.b., for Western shipments and 3.689c., Philadelphia. No. 10 blue annealed sheets at 4.25c., Pittsburgh; No. 28 black, 5c., and No. 28 galvanized, 6.25c.

Old Material.—Practically no business in iron and steel scrap is being done. Railroad congestion, weather conditions and the embargoes on shipments have combined to stifle business most effectually. There is a good demand in prospect from steel mills and bar iron rolling mills, and a return of more suitable conditions for trading is eagerly awaited by dealers. We quote as follows for delivery in the eastern Pennsylvania district, prices showing no changes from a week ago:

No. 1 heavy melting steel	$30.00
Steel rails, rerolling	35.00
Low phosphorus heavy melting	$38.00 to 40.00
Low phosphorus (not guaranteed)	33.00 to 35.00
Old iron rails	40.00 to 42.00
Old carwheels	30.00
No. 1 railroad wrought	35.00
No. 1 yard wrought	33.00 to 35.00
No. 1 forge fire	26.50 to 27.50
Bundled sheets	26.50 to 27.50
No. 2 busheling	17.00 to 18.00
Turnings (for blast furnace use)	17.50 to 18.00
Machine shop turnings (for rolling mill use)	19.00 to 19.50
Cast borings (for blast furnace use)	17.00 to 17.50
Cast borings (clean)	20.00
No. 1 cast	30.00
Grate bars	22.50 to 23.00
Stove plate	22.50 to 23.00
Railroad malleable	30.00
Wrought iron and soft steel pipes and tubes (new specifications)	32.50

Cleveland

CLEVELAND, Jan. 29—(*By Wire*).

The fuel situation in the Cleveland territory shows a slight improvement in spots, but this is not general. Ohio railroads in their attempts to clear up the car congestion and to get coal moving in increasing quantities have been hampered by continued cold weather and additional snowfall. The Otis Steel Co., Cleveland, has resumed operations in both its Riverside and Lakeside works, which were shut down for over a week for lack of coal, and the United Alloy Steel Corporation, Canton, has resumed partial operations. On the other hand, the McKinney Steel Co., Cleveland, has been forced to shut down another battery of 51 coke ovens, making one-half of its Cleveland coke oven plants closed down, and to bank one of its Cleveland blast furnaces. The American Steel & Wire Co. is operating its Cleveland plant about the same as a week ago, having two out of five stacks in blast and its Newburgh steel plants and wire plants running intermittently. Blast furnaces in the Cleveland territory are producing only about 75 per cent of their normal output because of the scarcity and poor quality of coke. Because of the inability of the railroads to deliver sheet bars from a western Pennsylvania mill, the Mahoning Valley Steel Co., in Niles, has shut down its sheet mills, and the mills of the Deforest Sheet & Tin Plate Co., Niles, are nearly all down.

Iron Ore.—There have been heavy reservations of Lake Superior ore, and actual sales of considerable ore have been made at 1917 prices subject to Government revision. Some ore firms have taken reservations and are now having clauses drawn up for their contracts making the price subject to Government revision, and plan to begin converting these reservations into contracts in a few days. Some of the small mining companies operating underground properties and having high operating costs announce that unless the Government authorizes higher prices they will mine only the minimum output required under their royalty contracts. Practically no ore has moved from the docks since Dec. 1, and the amount on the docks May 1 will probably be greater than ever before on that date. We quote present prices as follows: Old range Bessemer, $5.95; old range non-Bessemer, $5.20; Mesaba Bessemer, $5.70; Mesaba non-Bessemer, $5.05.

Pig Iron.—Pig iron market is less active than it has been for several weeks, but there is still a fair volume of inquiry for last half contracts for foundry iron. Some interests that were active sellers recently are taking few additional orders, now that prices are subject to Government revision, and many consumers are unable to cover for their requirements. Several sales of Buffalo iron were made in this territory during the week, but the seller has now withdrawn from the market. Two northern Ohio steel companies have so far been unable to purchase all the basic iron they inquired for recently. The General Electric Co. has renewed a recent inquiry for 2000 tons of malleable and 200 tons of Bessemer iron for its Erie plant for third quarter. A few Southern iron sales in small lots for the last half are reported. Furnaces are having a great deal of trouble in shipping iron because of embargoes. The embargo on Southern iron through Cincinnati continues, but some Southern iron is reaching northern Ohio points through Louisville. We quote, f.o.b. Cleveland:

Bessemer	$37.25
Basic	33.30
Northern No. 2 foundry	33.30
Southern No. 2 foundry	37.00
Gray forge	32.30
Ohio silvery, 8 per cent silicon	46.12
Standard low phosphorus, Valley furnace	50.00

Coke.—There is not much new demand, the interest in the market being centered in securing deliveries. A slight improvement in the situation as it applies to foundry coke is apparent as some fuel held up on cars is now coming through.

Finished Iron and Steel.—The scarcity of cars to move steel from the mills creates about as serious a situation as the scarcity of coal to operate the plants. Mills have quantities of rolled steel for which buyers are unable to get shipping permits, and much of this material is for Government work and badly needed. New demand is almost wholly for Government work, and it has become increasingly difficult for a consumer to secure steel for any reasonable delivery for any other use. This has resulted in a serious situation for the agricultural implement manufacturers who expect that they will do a record-breaking business this year if they are able to secure steel and to ship their finished products in time. Some factories are now clogged with finished implements awaiting shipment. A good volume of export implement orders is coming from England and France. New inquiries are largely for bars and

plates. Bar inquiries include one for 2000 tons from a jobber and 600 tons for Government work. The demand for sheets continues heavy, being mostly for blue annealed sheets for use in filling Government contracts.

We quote warehouse prices as follows: Steel bars, 4.03½c.; plates, 4.38½c.; structural material, 4.13½c.; No. 10 blue annealed sheets, 5.35c.; No. 28 black sheets, 6.35c.; No. 28 galvanized sheets, 7.60c.

Bolts, Nuts and Rivets.—The domestic demand for bolts and nuts from jobbers and manufacturers has improved. A great deal of Government business is being placed and a new inquiry for 37,000,000 bolts has come from one department. Rivet orders are being placed in heavy volume by shipbuilding companies in lots up to 1200 tons. Considerable new export demand is coming from England. Manufacturing conditions are very bad because of the scarcity of coal and lack of cars to ship the product.

Old Material.—There is little activity in the scrap market. This is due largely to the transportation situation. Dealers are able to buy but little material, and find it very difficult to make shipments, and consequently are doing very little trading. A few of the mills are badly in need of scrap, but the majority are apparently well supplied for the present. While mills are not active in the market, dealers say that they could sell a great deal of material were they to go after the orders. It has been almost impossible during the past few days to secure permits to ship scrap, but there is an indication of a slight easing up in this respect. Government prices on all grades are being maintained except on busheling. This grade is slightly easier. We quote, f.o.b. Cleveland, as follows:

Per Gross Ton

Steel rails	$27.00 to $28.00
Steel rails, rerolling	35.00
Steel rails, under 3 ft.	34.50 to 35.50
Iron rails	35.00
Iron car axles	45.00 to 46.00
Steel car axles	45.00 to 46.00
Heavy melting steel	30.00
Cast borings	20.00
Iron and steel turnings	20.00
No. 1 railroad wrought	35.00
Hydraulic compressed steel scrap	26.50 to 27.50
Carwheels	30.00
Relaying rails, 50 lb. and over	50.00 to 60.00
Agricultural malleable	24.00 to 25.00
Railroad malleable	30.00
Steel axle turnings	23.00 to 24.00
Light bundled sheet scrap	24.50 to 25.00
No. 1 cast	30.00
No. 1 busheling	30.00 to 31.00

Per Net Ton

Railroad grate bars	$20.00 to $21.00
Stove plate	20.00 to 21.00

Cincinnati

CINCINNATI, Jan. 29—(*By Wire*).

Pig Iron.—Freight embargoes against shipments from both the south and Virginia districts have been lifted spasmodically by one northern railroad. Usually before the customer can take advantage of the situation, the embargo is put on again, and no cars lately have crossed the river for consumers on the Ohio side. Southern Ohio furnaces can make shipments to some central Ohio points, but are practically cut off from Cincinnati and its immediate vicinity. Although the output in the Ironton district is far below normal, some furnaces there have been compelled to pile iron, being unable to ship it out as fast as made. A number of melters have been able to buy some off southern iron for first quarter shipment, but prospects are not bright for getting the metal delivered in contract time. Last-half business is still slow, although several southern interests will book orders for that shipment, all contracts being subject to Government revision of prices. The inquiry is light, although sellers have in hand a number of requests for prices sent in previously, most of which have not yet been acted on. The inability to obtain Ohio silvery iron is working a hardship on some foundries, which are compelled to reduce the percentage of scrap in their mixtures. No inquiries for either malleable or basic are out. The local foundries have all received emergency supplies of coke and are now operating, but unless shipments move faster, some will be compelled to suspend operations again within the next few days. Based on freight rates of $2.90 Birmingham and $1.26 Ironton, we quote f.o.b. Cincinnati as follows:

Southern coke, No. 2 foundry and 2 soft	$35.90
Southern Ohio coke, No. 2	34.26
Basic, Northern	34.26

Coke—A recent visitor from one of the large producing fields is authority for the statement that it was almost impossible to get labor during the recent extremely cold weather. As a consequence, some coke remained in the ovens as long as 100 hr. This condition did not exist in all of the producing districts to this extent. No improvement is noted in shipments, nor have the railroads been able to speed up deliveries. A few local and nearby foundries are still idle for the want of coke, and several furnaces in southern Ohio are operating on a hand-to-mouth basis, with little in sight to encourage them in expecting relief within the next few days.

Finished Material—The jobbers are doing a little more business with nearby customers, but are not yet able to make outside shipments. Hardware merchants are contracting for small lots of wire nails to be shipped next month, but their orders call for much smaller quantities than heretofore at this time of the year. The local warehouses have a good stock of wire nails and barb wire and when freight embargoes are lifted they will be able to fill all orders promptly. No incoming shipments from the mills are reported from any source. Stocks of cold rolled shafting are running low, but there is enough on hand to fill local requirements.

Jobbers' prices are unchanged as follows: Iron and steel bar, 4.08½c.; twisted bars, ¾ x 1¼-in., 4.23½c.; ⅝-in., 4.33½c.; ½-in., 4.43½c; ⅜-in., 4.63½c., and ¼-in., 4.88½c. Structural shapes are quoted at 4.18½c.; plates, ¼-in. and heavier, 4.43½c.; No. 10 blue annealed sheets, 5.43½c. Cold rolled shafting is sold at 10 per cent discount. The mill price on No. 28 black sheets is 5.18½c., and No. 28 galvanized 6.43½c.

Old Material—Dealers state that they have never known as dull a period at this time of the year. No business at all is being transacted except a few small contracts for future shipment. The amount of scrap involved, however, is too small to establish new prices. Some iron is bought by local foundries, mostly in less than carload lots. The following are dealers' prices f.o.b. Southern Ohio and Cincinnati:

Per Gross Ton

Bundled sheet scrap	$19.00
Old iron rails	$32.00 to 32.50
Relaying rails, 50 lb. and up	44.00 to 44.50
Rerolling steel rails	33.00 to 33.50
Heavy melting steel scrap	27.00
Steel rails for melting	27.00 to 27.50
Old carwheels	28.00

Per Net Ton

No. 1 railroad wrought	$29.00 to $29.50
Cast borings	13.00 to 13.50
Steel turnings	13.00 to 13.50
Railroad cast	24.50 to 25.00
No. 1 machinery	25.00 to 25.50
Burnt scrap	15.00 to 15.50
Iron axles	40.00 to 40.50
Locomotive tires (smooth inside)	33.50 to 34.00
Pines and flues	19.00 to 19.50
Malleable cast	23.50 to 24.00
Railroad tank and sheet	17.00 to 17.50

Birmingham

BIRMINGHAM, ALA., Jan. 29.

Furnace companies in the South are announcing their withdrawal from the market up to July 1 delivery except on a few grades and there is no effort being made, apparently, to get business beyond that period. Inquiries are very numerous and consumers are willing to have their orders accepted even with the stipulation of probable revision by the Government on all deliveries after April 1. Reiteration is to be heard of the statement that there is need for every ton of iron that can be produced. Like in other sections, extremely cold weather, coal and coke shortage and transportation troubles have interfered in the South, with both production and delivery. The month's output at the furnaces will be under expectations. The coal conservation order had no effect on the iron production.

No. 2 foundry iron is quoted at $33 per ton, f.o.b. furnaces.

Cast Iron Pipe—While there has been a resumption of operation at the cast iron pipe plants in this district, following the five days cessation of consumption of coal, the melt of iron is not as large as before the shut-down for the reason that the demand for pipe is not so urgent. There is hope that an improvement in the pipe trade is not far off, but no one can tell exactly when this improvement is likely to set in. Foundries and machine shops in the Birmingham district lost but little time through the fuel order by reason of the fact that hydro-electric power is used, but outside of this immediate section there was a curtailment of production.

Old Material—The scrap market is off and dealers are still uncertain as to an early improvement. The fuel conservation move had an effect and since that the consumers of old material have not shown a great amount of confidence. Stocks on hand are a little smaller than some time back and the numerous embargoes on the railroads prevent anything like normal business in the outside trade. While no changes are given in the quotations, it can be stated that $1 per ton lower is possible with the greater number of materials. The old material prices given as nominal quotations follow:

Old steel axles	$32.00 to $33.00
Old steel rails	28.00 to 30.00
Heavy melting steel	23.00 to 24.00
No. 1 R R wrought	28.00 to 32.00
No. 1 cast	25.00 to 27.00
Old car wheels	25.00 to 30.00
Tramcar wheels	20.00 to 25.00
Machine shop turnings	17.00 to 18.00
Cast iron borings	13.00 to 15.00

Coal and Coke—Operations in the coal fields and at the coke ovens in the Birmingham district show but little hesitation, despite the disorder that followed the fuel conservation plan of Dr. Garfield. There is, however, but little relief in the coal and coke needs and the railroads handling intra-district business are being urged to keep steady deliveries in order that there will be no shortage at the furnaces. Following a visit to Fuel Administrator Garfield by G. B. McCormack, president of the Alabama Coal Operators' Association, last week, it is announced that proposals looking to a full agreement between operators and union miners in Alabama will be adopted immediately and both interests work at full speed to meet demands. The operators claim there has been not the slightest inclination to recognize the union, while the union claims to have received numerous concessions outside of recognition.

St. Louis

ST. LOUIS, Jan. 28.

Pig Iron.—The continuance of severe weather has interfered considerably with the delivery of iron under contract to local and nearby consumers, but so far there have been no reports of shutdowns of moment as a result thereof. The closing orders of the Fuel Administrator have been observed on the east side of the river, the Mississippi being the dividing line and thus cutting the St. Louis industrial district in two. Wherever the industries were not exempt under the general or the special orders the time was utilized to such extent as the weather permitted in cleaning up the plants, doing repair work and otherwise taking advantage of the opportunity offered. The non-operating Mondays will be observed as directed. On the west side of the river the situation was governed entirely by the supplies of material. Representatives of the furnaces continue to report a superabundance of requests for iron in small lots which cannot be filled regardless of delivery asked, but there are some sales from day to day of lots which vary from the standard analyses and which have accumulated in the runs of furnaces.

Coke.—The traffic conditions have been most serious in recent weeks in coke deliveries. The pressure to relieve the extreme East has added to the seriousness of the conditions here and deliveries have been much reduced. Some melters have had to close. Business in coke has been in small lots.

Finished Iron and Steel.—The finished product market, so far as future contracting is concerned, is practically dead, representatives of mills confining themselves to the traffic problems involved in old contracts and the supplies available thereunder. Movement out of warehouses continues in heavy volume and is limited only by the amount of material available or coming in on warehouse orders from the mills. We quote for stock out of warehouse as follows: Soft steel bars, 4.17c.; iron bars, 4.17c.; structural material, 4.27c.; tank plates, 4.52c.; No. 8 sheets, 5.47c.; No. 10 blue annealed sheets, 5.52c.; No. 28 black sheets, cold rolled, one pass, 6.52c.; No. 28 galvanized sheets, black sheet gage, 7.77c.

Old Material.—The dealers have taken to doing a little trading among themselves, but aside from this there has been little in the way of development in scrap during the week. Embargoes are in effect at the yards of all the large consumers and the same condition exists with relation to the willingness of railroads to move material bought or sold. We quote dealers' prices, f.o.b. customers' works, St. Louis industrial district, as follows:

Per Gross Ton

Old iron rails	$36.00 to $36.50
Old steel rails, rerolling	34.50 to 35.00
Old steel rails, less than 3 ft.	37.50 to 38.50
Relaying rails, standard section, subject to inspection	60.00 to 75.00
Old carwheels	29.50 to 30.00
No. 1 railroad heavy melting steel scrap	29.50 to 30.00
Heavy shoveling steel	27.50 to 28.00
Ordinary shoveling steel	26.50 to 27.00
Frogs, switches and guards cut apart	29.50 to 30.00
Ordinary bundled sheet scrap	24.00 to 24.50
Heavy axle and tire turnings	22.50 to 23.00

Per Net Ton

Iron angle bars	$35.50 to $36.50
Steel angle bars	28.50 to 29.00
Iron car axles	45.50 to 46.00
Steel car axles	43.00 to 43.50
Wrought arch bars and transoms	41.50 to 42.00
No. 1 railroad wrought	30.75 to 31.25
No. 2 railroad wrought	30.00 to 30.50
Railroad springs	30.00 to 30.50
Steel couplers and knuckles	30.75 to 31.25
Locomotive tires, 42 in. and over, smooth inside	34.00 to 35.00
No. 1 dealers' forge	23.50 to 24.00
Cast iron borings	17.00 to 17.50
No. 1 busheling	25.50 to 26.00
No. 1 boilers, cut to sheets and rings	23.00 to 23.50
No. 1 railroad cast scrap	25.50 to 26.00
Stove plate and light cast scrap	20.50 to 21.00
Railroad malleable	26.00 to 26.50
Agricultural malleable	23.00 to 23.50
Pipes and flues	23.50 to 24.00
Heavy railroad sheet and tank scrap	22.50 to 23.00
Railroad grate bars	19.00 to 19.50
Machine shop turnings	17.50 to 17.75
Country mixed scrap	20.50 to 21.00
Uncut railroad mixed scrap	23.50 to 24.00

Buffalo

BUFFALO, Jan. 28.

Pig Iron.—Blast furnaces are still working under a handicap of irregular and insufficient supply of coke and coal and only partial railroad service in the movement of product from furnaces. On account of continued severe cold and adverse weather conditions offsetting the expected benefit not much relief or catching up on contract shipments from furnaces has resulted in this district from the five-day shut-down of industries not engaged in the getting out of war materials; but there are indications that with the advent of milder weather there will be a more adequate flow of fuel into Buffalo from mines and ovens. The Fuel Administrator has modified his order of Jan. 7, which cut off about 80 per cent of Buffalo's daily supply of bituminous coal, or 152 cars daily, and diverted it to New England points. Now only about 107 cars daily are cut off and diverted. Most of the industries which were unable to resume operations after the five-day shut-down, on account of lack of fuel, including a few foundries, will it is anticipated soon be able to resume in part, if not in full. The situation is very tight as to obtaining any iron for first half. Nothing but small lot off-grade iron or an occasional chance lot of extremely small tonnage is in any way before the market. One large firm sold a considerable tonnage last week

for last-half delivery and then withdrew from the market. We continue the price schedule established some time ago, f.o.b. furnace, Buffalo, as follows:

No. 1 foundry	$34.50
No. 2 X	33.50
No. 3 foundry	32.50
Gray forge	32.00
Malleable	33.50
Basic	33.00
Lake Superior charcoal, f.o.b. Buffalo	39.75

Finished Iron and Steel.—Continued cold weather, deep snows, traffic irregularity and congestion, freight embargoes, etc., are greatly interfering with and curtailing plant production of finished products. Such output as can be gotten out and forwarded is applied almost exclusively to war orders, and even delivery on Government material is halted. In fabricated material placement is noted of 8000 tons of structural steel for mail order department building for the T. Eaton Co., Ltd., Toronto, Ont., the contract going to the Dominion Bridge Co. This is in addition to the structural steel—22,000 tons—for the new department store for the Eaton company, the erection of which is being held in abeyance. Contract for 1800 tons of structural material for a new shipbuilding plant at Toronto has also been let jointly to the Dominion Steel Co. and McGregor & McIntyre, fabricators and erectors.

Old Material.—The market continues in about the same condition as reported a week ago, although shipping difficulties occasioned by severe weather, fuel transportation orders and further railroad embargoes have produced a more stagnant situation as regards transaction of business, so that actual trading is almost at a standstill, the tie-up in shipping facilities preventing the consummation of a large amount of business that otherwise would be brought to a conclusion. In the opinion of most dealers there is likely to be a modification in the price of all grades of scrap coming under the heading of No. 1 wrought, the price for which was recently fixed by the Government at $35 per ton, which modification will be brought about by the action of the American Iron and Steel Institute taken last week, recommending the appointment of a new committee on scrap classification and prices. For the present the price schedule remains the same as last week, which is as follows, per gross ton, f.o.b. Buffalo:

Heavy melting steel	$30.00
Low phosphorus	40.00
No. 1 railroad wrought	35.00
No. 1 railroad and machinery cast	30.00
Iron axles	$45.00 to 47.00
Steel axles	45.00 to 47.50
Carwheels	30.00
Railroad malleable	30.00
Machine shop turnings	18.00 to 18.50
Heavy axle turnings	26.00 to 27.00
Clean cast borings	19.00 to 20.00
Iron rails	37.00 to 38.00
Locomotive grate bars	25.00
Stove plate	25.00
Wrought pipe	29.00
No. 1 busheling scrap	30.00
No. 2 busheling scrap	22.00 to 24.00
Bundled sheet stamping scrap	22.00 to 24.00

British Steel Market

Strong Demand for Pig Iron—Ferromanganese Price for British Consumption Raised

LONDON, ENGLAND, Jan. 30.—(*By Cable.*)

The pressure of requirements for pig iron is unrelaxed and the stringency in hematite iron is increasing. There are no offerings of semi-finished steel and marked iron bars have been officially raised 10s. to £16 net f.o.t. The tin-plate market is quiet at 31s. 4½d., basis. For ferromanganese for America, $250 c.i.f. has been paid for forward shipment. The price for domestic consumption has been officially placed at £26 10s. per ton. We quote as follows:

Tin plates coke, 14 x 20; 112 sheets, 108 lb., f.o.b. Wales, 31s. 4½d.

Ferromanganese, $250 c.i.f. for export to America; £26 10s. for British consumption.

Ferrosilicon, 50 per cent, c.i.f. £35 upward.

On other products control prices are as quoted in THE IRON AGE of July 19, 1917, p. 171.

New York

NEW YORK, Jan. 30.

Pig Iron—The firm which last week offered to sell a considerable tonnage of Buffalo iron for delivery during the last half of this year withdrew from the market within a few days after having sold all it cared to dispose of. Its experience illustrates the alacrity with which iron can be sold whenever a seller evinces a disposition to take on any tonnage. The pig iron for sale from eastern Pennsylvania stacks is very limited and the same is true of Virginia and Alabama makers. On account of the embargoes, very little iron is being moved at the present time. For early delivery, we quote as follows:

No. 1 X	$35.25
No. 2 X	34.25
No. 2 Plain	33.75
No. 2 Southern (rail and water)	$38.75 to 39.25
No. 2 Southern (all rail)	39.15 to 39.65
No. 2 X Virginia	37.00 to 37.25

Ferroalloys—Because of the railroad tie-up some consumers of ferromanganese are having no little trouble in obtaining much needed supplies for which they have contracts. In one case the railroads have so far refused to accept the alloy for shipment from a Southern point to a large consumer in the interior. The market is more active so far as inquiries go but the volume is not large. There have been sales of 200 and 100-ton lots as well as of carloads, mostly at $250, delivered, which is regarded as the firm quotations for the first half. Some shading of this price is reported down to $240. The report that no more Brazilian manganese ore will be available for this country for the next 60 days causes much comment and the opinion is general that this embargo, coupled with the withdrawal by our own Government of vessels that have been carrying such ore will ultimately mean a serious situation for the steel industry, unless alleviated. A sale of 3000 tons of spiegeleisen, 20 per cent, to a Canadian consumer has been made for delivery in the latter part of the first half. The market is firm at $60, furnace, for the first half. Ferrosilicon, 50 per cent, is active at $175 to $190 per ton, according to the quantity desired, for February delivery. The 10 per cent electrolytic ferrosilicon is obtainable at $85 per ton. On certain other ferroalloys quotations are made in this column the first issue of each month.

Finished Iron and Steel—With the scale of operations of steel consumers much curtailed on account of the fuel supply and a similar curtailment with the steel producers, it is not surprising that no one is concerned over the low volume of business under consideration. An outstanding fact is that the supply of labor has been materially augmented. Particularly from New England do reports come that plants have no difficulty in securing labor. How far this represents releasing from relatively non-essential industries is not clear. It is an indication of the relocation of industrial activity and is regarded as a good omen in the matter of speeding up shipbuilding and other war operations. Reassuring reports are also received from New England sections that freight movements have been much improved, that general freight has been unloaded and order is proceeding on the railroads. A noteworthy price concession is noted in a sale to the Government of upward of 500 tons of machine bolts. The circumstance is not regarded as indicative of any general condition, but the remarkable fact is that against a price which corresponds to about 6c. per pound under the Government scale, the business was taken at 5.25c., showing the cutting of about $15 per ton. The tremendous extent of Government buying of fabricated steel is indicated in the report elsewhere reviewed of the Bridge Builders and Structural Society. The December bookings totaled 205,000 tons, or 14 per cent above the country's capacity, against 138,500 tons in November. Besides the 500 buildings for the Signal Corps, noted last week, 66 x 140 ft. in plan, and involving perhaps 20,000 tons, is to be noted an inquiry for 1000 buildings for the Signal Corps, 50 x 100 ft., involving about 25,000 tons. The War Department will erect a 200-ton structure for assembling purposes at

Metuchen, N. J., and the Bureau of Yards and Docks has taken bids for marine runways at Boston and Charleston, S. C., involving 800 to 900 tons, which bids incidentally have been rejected. For the quartermasters Department the American Bridge Co. is to build a number of structures in the United States totaling 3000 tons. This company it appears has taken 8500 tons for the nitrating plant near Sheffield. The Southern Railway is inquiring for 800 tons of bridge work and the New York Central for 300 tons. We quote mill shipments of steel bars at 3.095c., New York; shapes 3.195c., plates 3.445c. and bar iron 3.695c., New York. Out of store prices are 1c. higher.

Cast Iron Pipe—The city of Buffalo is expected to make an award this week on 1000 tons and this is the principal municipal business in sight. The shading of the Government price by the United States Cast Iron Pipe & Foundry Co. on the 1450 tons recently awarded by the city of Boston is not regarded as fixing a new price and nominal quotations continue as follows: $55.35, New York, for 6-in. and heavier, and $58.35 for 4-in.; $65.35 for 3-in. and $1 additional for class A and gas pipe.

Old Material.—The old material market is very much depressed. Leading brokers are not doing one-tenth of the business they have done in prosperous times and express themselves as thoroughly discouraged. This condition is due largely to embargoes which have been declared and the extreme difficulty in obtaining permits even when the general embargoes are lifted. Hundreds of cars are congested in this district. There is some agitation in favor of obtaining permission to charge several dollars extra for breaking cast scrap, as is done in the case of preparing heavy melting steel for special use. It is probable that a decision on this point will be made by the American Iron and Steel Institute at an early date. Prices on heavy melting steel are no longer figured by deducting the freight rate from the delivered price of $30, as dealers are selling for what they are compelled to accept. We quote prices of brokers as follows to New York producers and dealers, per gross ton, New York:

Heavy melting steel	$26.25 to $27.75
Rerolling rails	32.80
Relaying rails	$60.00 to 70.00
Iron and steel car axles	45.30
No. 1 railroad wrought	32.80
Wrought-iron track scrap	32.80
No. 1 yard wrought long	32.80
Light iron	9.00 to 10.00
Cast borings (clean)	17.80 to 18.80
Machine-shop turnings	17.80 to 18.80
Mixed borings and turnings	14.50 to 15.50
Wrought-iron pipe (1 in. minimum diameter), not under 2 ft. long	29.00 to 30.00

Dealers in New York and Brooklyn are quoting as follows to local foundries, per gross ton, but for delivery to cupola platforms of Brooklyn foundries about $3 more is quoted:

No. 1 machinery cast	$27.80 to $28.50
No. 1 heavy cast (columns, building materials, etc.)	25.00 to 26.00
No. 2 cast (radiators, cast boilers, etc.)	24.00 to 25.00
Stove plate	23.00 to 24.00
Locomotive grate bars	23.00 to 24.00
Malleable cast (railroad)	27.80 to 28.50
Old carwheels	27.80 to 28.50

New Plant to Make Gun Mounts

New buildings are to be erected on property adjoining that of the New Britain Machine Co., New Britain, Conn., by the Ordnance Department of the United States Army for the manufacture of gun mounts. Contracts for the buildings have been let to the Aberthaw Construction Co., Boston. The New Britain Machine Co. will operate the Government plant. Major F. B. Wheaton of the Ordnance Department is in charge of the work.

The Reading Iron Co. has granted another raise to puddlers. They were getting $11 a ton. They will now receive $11.60 per ton, or $7.00 for the puddler and $4.60 for the helper. Over 2000 men are affected.

IRON AND INDUSTRIAL STOCKS

Values Not Influenced by War News Either at Home or Abroad

An uneventful week has passed, both transactions and price fluctuations being of small proportion. The indifference of stock values to events of national and international importance is cited as evidence of a fundamentally strong market position. The public apparently has cut its dealings to a minimum and waits for definite war or peace moves before buying freely.

The range of prices on active iron and industrial stocks from Tuesday of last week to Wednesday of this week was as follows:

Allis-Chalm. com.	18⅞ - 20¼	Int. Har. Corp. com.	64¾ - 67½
Allis-Chalm. pf.	73 - 74⅜	Lacka. Steel	75 - 76¾
Am. Can com.	36⅛ - 38¼	Lake Sup. Corp.	13 - 13⅝
Am. Can pf.	89¼ - 89¾	Midvale Steel	43½ - 44½
Am. Car & Fdry. com.	70¼ - 73	Nat.-Acme	30
Am. Car & Fdry. pf.	109	Nat. En. & Stm. com.	42 - 44⅛
Am. Loco. com.	55¼ - 57⅞	N. Y. Air Brake	120¼-124
Am. Loco. pf.	96 - 96⅛	Nova Scotia Stl.	63¼ - 66
Am. Ship com.	89¾	Press. Steel com.	60½ - 62½
Am. Steel Fdries.	59½ - 61	Ry. Steel Spring com.	49⅛ - 52⅜
Bald. Loco. com.	58½ - 62¾	Republic com.	73½ - 76
Bald. Loco. pf.	96	Republic pf	94⅞ - 95
Beth. Steel com.	75⅛ - 79⅜	Sloss com.	39 - 39½
Beth. Stl., Cl. B.	72⅞ - 77⅜	Superior Steel	34¾ - 35
Can. Car & Fdry. com.	19	Transue-Wms.	39⅞
Chic. Pn. Tool	48½ - 50	Un. Alloy Steel	37½ - 38
Colo. Fuel	35 - 37¼	U. S. Pipe com.	12⅛ - 13½
Cruc. Steel com.	53¼ - 57½	U. S. Steel com.	89⅜ - 93⅞
Gen. Elec.	129 -132¾	U. S. Steel pf.	109⅛-110⅛
Gt. No. Ore Cert.	26¼ - 27⅜	Va. I. C. & Coke	51½ - 53
Gulf. States Stl.	89 - 91	Warwick	8¼
Int. Har. of N. J. com	120 -120½	Westingh. Elec.	39¾ - 40⅞

Bethlehem Steel Report

Chairman C. M. Schwab of the Bethlehem Steel Corporation, after the meeting Jan. 29 of the board of directors, made the following statement as to the business of the corporation for the fiscal year ending Dec. 31, 1917, in comparison with the previous year:

	Year Ended Dec. 31, 1917	Year Ended Dec. 31, 1916
Total net earnings from operations of the corporation and its subsidiary companies, after deducting for all taxes (estimated) and expenditures for ordinary and extraordinary repairs and maintenance	$52,651,431.54	$61,717,309.58
Less: Interest on bonds and notes of subsidiary companies	7,419,053.94	3,772,555.67
	$45,232,377.60	$57,944,753.91
Deduct: Provision for depreciation and depletion	17,911,640.74	14,350,785.75
Net income for the year	$27,320,736.86	$43,593,968.16
*Gross sales and earnings	$296,000,000.00	$216,284,555.53
*Per cent net income for the year	9.25	20.16
Value of orders on hand (December estimate)	$450,500,000.00	$193,374,248.69

*Approximate.

The board of directors declared the following dividends: For the year, 8 per cent on the new 8 per cent cumulative preferred stock, and 7 per cent on the old 7 per cent preferred stock; for the quarter, 2½ per cent for both classes of common stock. The charter provides for the payment of dividends on the common stock after yearly dividend payments on the preferred stock and for that reason the preferred stock dividends were declared for the year, rather than for the quarter.

Brier Hill Meeting

The annual meeting of stockholders of the Brier Hill Steel Co. was held in its general offices in Youngstown, Ohio, last week. Reports showed that the gross business of the company in 1917 was $51,000,000 and gross earnings were $24,000,000. The corporation carried $10,000,000 to surplus in 1917, making a total of $17,542,000. An additional $2,225,000 was carried to depreciation fund in 1917. The estimated excess profit tax is $8,900,000. The Brier Hill Steel Co. owns $12,000,000 in foreign and domestic Government securities. Of these $7,000,000 are United States short

term notes and $2,000,000 Liberty Bonds. The company has $8,000,000 of new construction under way, consisting of two plate mills, blast furnaces and other extensions. Its steel output in 1917 was 549,000 tons. The company has outstanding common stock to the amount of $12,299,000, and preferred $5,000,000. Its net earnings available for common, therefore, were about $86 a share. The former board of directors and officers were re-elected.

Industrial Finances

The Connecticut Alloyed Metals Co., New York and Stratford, Conn., has been put in the hands of receivers. It is reported that an effort will be made to reorganize the company.

Dividends

The Brier Hill Steel Co., quarterly, 1½ per cent on the common and 1¾ per cent on the preferred, payable April 1.

The Canada Foundries & Forgings, quarterly, 3 per cent on the common and 1¾ per cent on the preferred, payable Feb. 15.

The Cleveland-Cliffs Iron Co., quarterly, 2½ per cent and extra 5 per cent on the common, payable Jan. 25.

The Harbison-Walker Refractories Co., quarterly, 1½ per cent on the common, payable March 10, and 1½ per cent on the preferred, payable April 20.

The Penn-Seaboard Steel Corporation, quarterly, $1, payable Feb. 1.

The Pressed Steel Car Co., quarterly, 1¾ per cent on the common, payable March 6, and 1¾ per cent on the preferred, payable Feb. 26.

The Stewart-Warner Speedometer Co., quarterly, 1½ per cent, payable Feb. 15.

Pittsburgh and Nearby Districts

The regular monthly meeting of the Pittsburgh Foundrymen's Association was held in the Carnegie Technical Schools, Pittsburgh, on Monday evening, Jan. 21. It was also ladies' night and a number visited the schools and saw the practical operation of a foundry. The other departments of the Carnegie schools were also visited and dinner was served.

The Mesta Machine Co., Pittsburgh, builder of rolling mill and steel works equipment of all kinds, has opened a branch office in room 312, Munsey Building, Washington, D. C.

Western Scrap Organization Formed

The Western Division of the American Board of Scrap Iron Dealers is being organized in Chicago. D. Cohen is chairman, F. Mayer vice-chairman and Benjamin Friedman secretary. The Western Division will look after the interests of the scrap trade, as the Eastern Division will do from the main office of organization in Philadelphia, and the Central Division will do for Cleveland, Detroit, Youngstown and Pittsburgh. Much good already has been accomplished by the organization, which is on the way to a firm foundation.

Iron Company Suffers Fire Loss

An explosion followed by a fire on Jan. 29 destroyed the alcohol refining plant of the Pioneer Iron Co. at Negaunee, Mich., owned by the Cleveland-Cliffs Iron Co., Cleveland, with a loss estimated at $100,000. There was no loss of life, but two workmen were injured.

Linemen's pliers in which the handles are covered with a semi-soft insulating compound have been brought out by the Rubber Insulated Metals Corporation, Plainfield, N. J. The substitution of this form of insulation for a hard compound, it is pointed out, has resulted in the securing of an insulation that will not crack or break when dropped from the cross-arm of a pole. The union between the rubber compound and the metal is effected by a patented process which is claimed to give a permanent attachment of the insulation to the metal.

DAYLIGHT-SAVING BILL

Strong Influence Favors Early Passage by Congress

WASHINGTON, Jan. 29.—The early passage of the bill providing for daylight-saving has been made the subject of a vigorous drive by a large contingent of representative business men from the leading industrial centers of the country, who are urging prompt action on the ground that the measure is of special timeliness when the whole country is engaged in the effort to conserve fuel, to increase production and especially to augment the food supply. As it is proposed that the new legislation shall become operative in April, its promoters are seeking to enlist all possible assistance and are urging manufacturers and other business men in all lines to solicit the co-operation of their representatives in Congress.

The daylight-saving bill, which was originally presented in Congress by Senator Calder, of New York, was favorably reported from the Senate Committee on Interstate Commerce last May and was passed by the Senate a short time before Congress adjourned in October. It is now before the House Committee on Interstate and Foreign Commerce and it is upon the members of this committee that pressure is now being concentrated for speedy action. President Wilson has been interested in the legislation as the result of several visits to the White House by Senator Calder and the heads of all the executive departments in Washington are understood to be strongly favorable to the measure.

The chief feature of the Calder bill provides that on the last Sunday in April the clocks throughout the country shall be set ahead one hour. Thus for five months the entire country, both as to its domestic and its business concerns, would start and finish the day one hour earlier than heretofore. Administrative provisions of the bill prescribe the manner in which the railroads of the country would make the change without necessitating the reprinting of time tables and experts agree that no serious inconvenience on this score would be occasioned. New York, Boston, Philadelphia, Rochester, Pittsburgh and Detroit are among the cities represented here by advocates of this legislation who are working for the early passage of the measure by the House. Robert Garland, president of the Chamber of Commerce of Pittsburgh, who is also chairman of the Daylight Saving Committee of the Chamber of Commerce of the United States, has been especially active in the effort to secure action by the Committee on Interstate and Foreign Commerce. A resolution favoring the legislation was unanimously adopted by the directors of the National Chamber, while thousands of Pittsburgh manufacturers are on record in favor of the change.

Mr. Garland has presented statistics showing the economies that have been made in several of the foreign countries where daylight saving has been adopted as a war measure but where it will undoubtedly become a permanent fixture. In England alone in the short space of five and a half months, no less than $12,000,000 worth of fuel was saved, while in France statistics covering a similar period show economies aggregating $10,000,000. Data obtained in Birmingham, Manchester, Glasgow and Belfast show important savings and similar reports have been received from Berlin and Vienna. Many manufacturing concerns report not only important savings in fuel used for lighting purposes but also in the way of increased product due chiefly to the fact that a cool morning hour is substituted for a hot afternoon hour which enables workmen to do more and better work. The general health of operatives is also greatly improved, according to all reports, this result being due in part to the better conditions of labor but also to the fact that more daylight hours for outdoor recreation and light physical labor are afforded.

Fire, Jan. 18, entirely destroyed the plant of the Standard Slag Co., Youngstown, Ohio, with loss estimated at $40,000.

Metal Markets

The Week's Prices

Cents Per Pound For Early Delivery

	Copper, New York		Tin,	Lead		Spelter	
	Lake	Electro-	New	New	St.	New	St.
Jan		lytic	York	York	Louis	York	Louis
23	23.50	23.50	86.00*	7.00	6.85	7.87½	7.62½
24	23.50	23.50	86.00*	7.00	6.85	7.87½	7.62½
25	23.50	23.50	85.00*	7.00	6.85	7.87½	7.62½
26	23.50	23.50	.....	7.00	6.85	7.87½	7.62½
29	23.50	23.50	85.00*	7.00	6.85	7.87½	7.62½

*Nominal

NEW YORK, Jan. 30.

Monday, fuelless day, was a holiday. The markets continue largely inactive except copper, in which buying has been brisk. Tin for spot delivery is still scarce and nominal. Lead is lifeless but firm at unchanged prices. Spelter continues inactive with no change in quotations.

New York

Copper.—The official statement, announced in this column last week, that the Government price of 23.50c. for copper would remain in force until June 1 has steadied the situation. Buyers, who had held back on various rumors as to price changes, have come into the market in the last week and purchases have been on a large scale for all positions up to June 1. They include both Government and domestic business, subject to the usual regulations. The jobbing business has also been good at 24.67½c. per lb. Spot copper is scarce but it is regarded as temporary. Railroad congestion is interfering with shipments to eastern refineries, which explains the temporary shortage. December exports are estimated at 35,000 gross tons, making the 1917 total a record at 484,123 tons.

Tin.—A very bad situation exists in the tin market in New York. If an importer succeeds in getting the metal into port, it is extremely difficult to ship it because of railroad embargoes. If it remains on docks too long, the steamship company puts it in storage warehouses. If it comes overland, demurrage risks are encountered. If it goes into warehouses, it becomes commandeered by the Government. This is evidence enough that dealers are in the midst of many troubles. The feature of the market in the last week was the commandeering by the Government on Jan. 23 of all tin in warehouses, this time for the Army's use. The first time, some weeks ago, it was for the Navy's urgent needs. It is understood that some of the tin confiscated last week has been released to regular consumers to whom it belonged. Spot tin continues critically scarce and nominal at 85c., New York. Reports have it that from 90c. to $1 per lb. has been paid for small spot lots of a ton or so. In general the market is quiet. Last Saturday some business was quietly done in far off tin, but the demand was not widespread. Yesterday there were transactions in March and April shipment from the East. Arrivals reported to June 29 inclusive have been 1720 tons with 5300 tons afloat. The London market has receded to £299 10s. per ton for spot Straits yesterday, against £302 a week ago.

Lead.—The market continues at the standstill noted a week ago, with little demand and with quotations practically nominal and unchanged at 6.85c., St. Louis, or 7c., New York, in the outside market. The leading producer's price is still 6.75c., New York, at which level it is said no February shipments are being made; March business, however, is being accepted. Transportation difficulties are the dominant factor. The supply of metal is low in most markets and at refineries, but there is plenty in cars on the way. Reports are current of sales of spot lead at 7.37½c. during the week, with retail lots going at 7.75c., New York.

Spelter.—Outside of a little business here and there the market continues in its stagnant condition. Evidence of this is contained in the fact that there has been scarcely any change in the price level for the greater part of nearly two months. The quotation for prime Western continues at 7.62½c. to 7.75c., St. Louis, or 7.87½c. to 8c., New York, for early delivery, with spot metal at 8c., New York, at which some small sales are reported. Nothing new is heard regarding a fixed price for Grade A. Exports are declining because ships are needed for other purposes. This fact has tended to offset any shrinkage in supplies due to the continual contraction in production. Western mining interests have recently met in Washington and notified the Government that they could not earn a profit with the price for spelter under 10c. They requested a fixed price at this line.

Antimony.—The market is quiet and unchanged at 14c. to 14.25c., duty paid, New York, for Chinese and Japanese grades for spot and early delivery.

Aluminum.—No. 1 virgin metal, 98 to 99 per cent pure, is obtainable for 36c. to 38c. per lb., New York, for spot and early delivery. The market is inactive.

Old Metals—The market is quiet. Dealers' selling prices are nominally as follows:

	Cents per lb.
Copper, heavy and crucible (nominal)	23.50
Copper, heavy and wire (nominal)	23.50
Copper, light and bottoms	21.00 to 21.50
Brass, heavy	17.00 to 17.25
Brass, light	12.25 to 12.50
Heavy machine composition	24.00 to 24.25
No. 1 yellow rod brass turnings	13.25 to 13.50
No. 1 red brass or composition turnings	19.00 to 20.00
Lead, heavy	6.50
Lead, tea	5.25
Zinc	6.00

Chicago

JAN. 28.—So great is the scarcity of copper that consumers in nearby cities are telegraphing Chicago dealers begging for lots of from 1000 to 10,000 lb. The situation is attributed to the refusal of the producers to ship at Government prices in December when transportation was fairly good. Now they can't ship, and there is a great call for the metal. It is reported that the Government has taken practically all of the stock of spot tin and only small lots are available for the private consumer. Lead has been fairly active. We quote copper in carloads, 23.50c.; part carloads, 24.67½c.; tin, 85c. to 95c.; lead, 6.75c. to 6.85c.; spelter, 7.70c. to 7.80c; antimony, 16.50c. On old metals we quote buying prices for less than carload lots as follows: Copper wire, crucible shapes, 21c.; copper clips, 20c.; copper bottoms, 19c.; red brass, 19.50c.; yellow brass, 14.50c.; lead pipe, 5c.; zinc, 5c.; pewter, No. 1, 40c.; tinfoil, 47.50c., and block tin, 55c.

St. Louis

JAN. 28.—Non-ferrous metals have been rather quiet, though there has been a somewhat firmer feeling, due in part to the interference with lead and spelter production by the bad weather. On carload lots the closing quotations were: Lead, 6.90c. to 7c.; spelter, 7.75c. In less than carload lots the quotations were: Lead, 7.50c.; spelter, 8.50c.; tin, 90c.; copper, 25.12c.; Asiatic antimony, 18c. In the Joplin district better settlements are reported for second grade blend, but the range, basis of 60 per cent metal, for zinc ore, was for the week $50 to $70 per ton, with the average for the district at $56 per ton for the week. In calamine the range, basis of 40 per cent metal, was $30 to $33, with the average for the week for the district at $33 because of premium sales. In lead the ore market was firm at $80 per ton, with the average for the week for the district at $80, basis of 80 per cent metal. Railroads are accepting very few shipments at present, and production is at the lowest ebb for many months. On miscellaneous scrap metals we quote dealers' buying prices as follows: Light brass, 10c.; heavy yellow brass, 14c.; heavy red brass and light copper, 19.50c.; heavy copper and copper wire, 20c.; pewter, 25c.; tinfoil, 50c.; zinc, 5c.; lead, 5.50c.; tea lead, 5c.

Chairman Sims of the House Committee on Interstate and Foreign Commerce has prepared an amendment that will probably be adopted making the proposed change in clocks effective in 20 days after the passage of the act and continuous throughout the war.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight rates from Pittsburgh on iron and steel articles, aside from wrought iron and steel pipe in carloads, per 100 lb., New York, 19.5c.; Philadelphia, 18.5c.; Boston, 21.5c.; Buffalo, 11.6c.; Cleveland, 13.5c.; Cincinnati, 18.5c.; Indianapolis, 20c.; Chicago, 21.5c.; St. Louis, 27c.; Kansas City, 47c.; minimum carload, 36,000 lb.; St. Paul, 43c.; minimum carload, 36,000 lb.; Denver, 79c.; minimum carload, 36,000 lb.; Omaha, 47c.; minimum carload, 36,000 lb.; New Orleans, 30.7c.; Birmingham, 46c.; Pacific Coast, 75c.; minimum carload, 80,000 lb. To the Pacific Coast the rate on steel bars and structural steel is 90c., minimum carload, 40,000 lb.; and 85c., minimum carload, 50,000 lb. On wrought iron and steel pipe the rate from Pittsburgh to Kansas City is 43c. per 100 lb., minimum carload 46,000 lb.; to Omaha, 40c., minimum carload 46,000 lb.; to St. Paul, 35.5c., minimum carload 46,000 lb.; Denver, 79c., minimum carload 46,000 lb. A 3 per cent transportation tax now applies.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in. angles, 3 to 6 in. on one or both legs, ¼ in thick and over, and zees, structural sizes, 3c.

Wire Products

Wire nails, $3.50 base per keg; galvanized, 1 in. and longer, including large-head barb roofing nails taking an advance over this price of $2, and shorter than 1 in., $2.50. Bright basic wire, $3.35 per 100 lb.; annealed fence wire, Nos. 6 to 9, $3.25; galvanized wire, $3.95; galvanized barb wire and fence staples, $4.35; painted barb wire, $3.65; polished fence staples, $3.65; cement-coated nails, $3.40 base; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 47 per cent off list for carload lots, 46 per cent for 1000-rod lots, and 45 per cent off for small lots, f.o.b. Pittsburgh.

Bolts, Nuts and Rivets

Large rivets	$4.65 base
7/16 in. x 6 in. smaller and shorter rivets	45-10 per cent off list
Machine bolts h.p. nuts, ⅝ in. x 4 in.:	
Smaller and shorter, rolled threads	50-10-5 per cent off list
Cut threads	50-5 per cent off list
Larger and longer sizes	40-10 per cent off list
Machine bolts c.p.c. and t. nuts, ⅝ in. x 4 in.:	
Smaller and shorter	40-10 per cent off list
Larger and longer	35-5 per cent off list
Carriage bolts, ⅜ in. x 5 in.:	
Smaller and shorter, rolled threads	50-5 per cent off list
Cut threads	40-10 per cent off list
Larger and longer sizes	40 per cent off list
Lag bolts	50-10 per cent off list
Plow bolts, Nos. 1, 2, 3	50 per cent off list
Hot pressed nuts, sq., blank	2.50c. per lb. off list
Hot pressed nuts, hex., blank	2.30c. per lb. off list
Hot pressed nuts, sq., tapped	2.30c. per lb. off list
Hot pressed nuts, hex., tapped	2.10c. per lb. off list
C.p.c. and t. sq. and hex. nuts, blank	2.25c. per lb. off list
C.p.c. and t. sq. and hex. nuts, tapped	2.00c. per lb. off list
Semi-finished hex. nuts:	
⅜ in. and larger	60-10-10 per cent off list
9/16 in. and smaller	70-5 per cent off list
Stove bolts	70-10 per cent off list
Stove bolts	2½ per cent extra for bulk
Tire bolts	50-10-5 per cent off list

The above discounts are from present lists now in effect. All prices carry standard extras.

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, $57; chain rods, $65; screw, rivet and bolt rods and other rods of that character, $65. Prices on high carbon rods are irregular. They range from $70 to $80, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes, 9/16 in. x 4½ in. and heavier, per 100 lb., $3.90, in lots of 200 kegs of 200 lb. each, or more; track bolts, $4.90. Boat spikes, $5.25 per 100 lb., f.o.b. Pittsburgh.

Terne Plate

Effective Nov. 7 prices on all sizes of terne plates are as follows: 8-lb. coating, 200 lb., $15 per package; 8-lb. coating, I. C., $15.30; 12-lb. coating, I. C., $16.75; 15-lb. coating, I. C., $17.75; 20-lb. coating, I. C., $19; 25-lb. coating, I. C., $20; 30-lb. coating, I. C., $21; 35-lb. coating, I. C., $22; 40-lb. coating, I. C., $23 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars at 2.90c. from mill, and 4.50c. to 5c. from warehouse in small lots for prompt shipment. Refined iron bars, 3.50c. in carload and larger lots, f.o.b. mill.

Wrought Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card, as announced Nov. 5 by the Government on steel pipe, those on iron pipe being the same as quoted for some time:

Butt Weld

Steel: Inches	Black	Galv.	Iron: Inches	Black	Galv.
⅛, ¼ and ⅜	44	17½	⅛ and ¼	23	+4
½	48	33½	⅜	24	+3
¾ to 3	51	37½	½	28	10
			¾ to 1½	33	17

Lap Weld

2	44	31½	1¼	18	3
2½ to 6	47	34½	1½	25	11
7 to 12	44	30½	2	26	12
13 and 14	34½	..	2½ to 6	28	15
15	32	..	7 to 12	25	12

Butt Weld, extra strong, plain ends

⅛, ¼ and ⅜	40	22½	⅛, ¼ and ⅜	32	5
½	45	32½	½	27	14
¾ to 1½	49	36½	¾ to 1½	33	18
2 to 3	50	37½			

Lap Weld, extra strong, plain ends

2	42	30½	1¼	19	4
2½ to 4	45	33½	1½	25	11
4½ to 6	44	32½	2	27	14
7 to 8	40	26½	2½ to 4	29	17
9 to 12	35	21½	4½ to 6	28	16
			7 to 8	20	8
			9 to 12	15	3

To the large jobbing trade an additional 5 per cent is allowed over the above discounts, which are subject to the usual variations in weight of 5 per cent. Prices for less than carloads are four (4) points lower basing (higher price) than the above discounts on black and 5½ points on galvanized.

On butt and lap weld sizes of black iron pipe, discounts for less than carload lots to jobbers are seven (7) points lower (higher price) than carload lots, and on butt and lap weld galvanized iron pipe are nine (9) points lower (higher price).

Boiler Tubes

The following are the prices for carload lots, f.o.b. Pittsburgh, announced Nov. 13, as agreed upon by manufacturers and the Government:

Lap Welded Steel		*Charcoal Iron*	
3½ to 4½ in.	34	3½ to 4½ in.	12½
2½ to 3¼ in.	24	3 to 3¼ in.	+ 5
2¼ in.	17½	2½ to 2¾ in.	+ 7½
1¾ to 2 in.	13	2 to 2¼ in.	+22½
		1¾ to 1⅞ in.	+35

Standard Commercial Seamless—Cold Drawn or Hot Rolled

	Per Net Ton		Per Net Ton
1 in.	$236	1¾ in.	$220
1¼ in.	230	2 to 2½ in.	190
1⅜ in.	225	2¾ to 3¾ in.	180
1½ in.	220	4 in.	206
		4½ to 5 in.	220

These prices do not apply to special specifications for locomotive tubes nor to special specifications for tubes for the Navy Department, which will be subject to special negotiation.

Sheets

Makers' price for mill shipments on sheets of United States standard gage in carload and larger lots, are as follows, 30 days net or 2 per cent discount in 10 days:

Blue Annealed—Bessemer	Cents per lb.
No. 8 and heavier	4.20
Nos. 9 and 10	4.25
Nos. 11 and 12	4.30
Nos. 13 and 14	4.35
Nos. 15 and 16	4.45
Box Annealed, One Pass Cold Rolled—Bessemer	
Nos. 17 to 21	4.80
Nos. 22 and 24	4.85
Nos. 25 and 26	4.90
No. 27	4.95
No. 28	5.00
No. 29	5.10
No. 30	5.20
Galvanized Black Sheet Gage—Bessemer	
Nos. 10 and 11	5.25
Nos. 12 and 14	5.35
Nos. 15 and 16	5.50
Nos. 17 to 21	5.65
Nos. 22 and 24	5.80
Nos. 25 and 26	5.95
No. 27	6.10
No. 28	6.25
No. 29	6.50
No. 30	6.75
Tin-Mill Black Plate—Bessemer	
Nos. 15 and 16	4.80
Nos. 17 to 21	4.85
Nos. 22 to 24	4.90
Nos. 25 and 27	4.95
No. 28	5.00
No. 29	5.05
No. 30	5.10
Nos. 30½ and 31	5.10

OBITUARY

SAMUEL ALLEN RICHARDS, formerly manager of the Struthers Furnace Co., and well-known in the blast furnace industry in the Central West, died suddenly Jan. 23, at the home of his son, Jules G. Richards, at Struthers, Ohio, aged 73 years. He had spent the day in Cleveland, attending the annual meeting of the Struthers Furnace Co., during which he was re-elected a director. He was born in Akron, Ohio, and when a young man was employed by the Girard Iron Co., Girard, Ohio, formed by a partnership of his father with David Tod, William Ward and Joseph G. Butler, Jr. Later he was a member of the blast furnace firm of William Richards' Sons, at Warren, Ohio. In 1878 he became manager of a blast furnace at Braddock, Pa., and afterward was identified with the Illinois Steel Co., at Joliet, as blast furnace superintendent. After leaving that company, he traveled for several years for blast furnace and foundry interests, and in 1892 took charge for a short time of a furnace in West Duluth, Minn. With W. C. Runyan he purchased the Struthers furnace in 1896 and became its manager.

THOMAS FAWCUS, organizer and president of the Fawcus Machine Co., Pittsburgh, died at his home in that city Tuesday, Jan. 22, after an illness of four weeks. He was born in England in 1866 and came to this country in 1898, locating at Birmingham, Ala. Later he became connected with enterprises at Chattanooga, Tenn. He then went to Pittsburgh and was connected in various capacities with the Westinghouse Electric & Mfg. Co., the Anderson-DuPuy Steel Co. and the R. D. Nuttall Co. In 1890 he organized the Fawcus Machine Co., manufacturer of cut gears, of which he was president at the time of his death.

PARK PAINTER, one of the pioneer iron manufacturers of Pittsburgh, died Jan. 25, in the Belgravia Hotel, Philadelphia, after an illness of about a year. Mr. Painter was born in Pittsburgh, was graduated from Chester Academy in 1866 and soon after entered the iron manufacturing business, organizing the company of Jacob Painter & Sons. This company continued to operate until 1903, when it was sold to the American Steel Hoop Co., at which time Mr. Painter moved to Philadelphia.

JOSEPH M. BABBITT, retired manufacturer of boilers and boiler specialties, died Jan. 12 at his home in New Bedford, Mass., aged 72 years. From 1880 to 1907 he was a member of the firm of Babbitt, Wood & Co., New Bedford, associated with Patrick F. Wood and George B. Oswell. The partnership then dissolved and was succeeded by the Babbitt Steam Specialty Co., and the P. F. Wood Boiler Works. In 1912 he retired, selling his interest in his new company to his nephew, Isaac M. Babbitt.

WINSLOW BRIGHAM BENT, widely known in the steel business and uncle of Quincy Bent, vice-president of the Bethlehem Steel Corporation, died Jan. 25, at his home in Haverford, Pa., aged 93 years. He was a brother of Maj. Luther S. Bent, a Civil War veteran and an official of the Pennsylvania Steel Co. While Major Bent was president of the Pennsylvania Steel Co. his brother had charge of one of the departments.

ARTHUR E. WHITNEY of the Whitney Machine Co., Winchester, Mass., died Jan. 15, aged 70 years. He was the inventor of tannery machinery improvements and was the son of Joel Whitney, founder of the Whitney Machine Co in 1844. He is survived by his widow and three sons, one of whom, Robert S. Whitney, is now president of the company.

FRANK R. BLAUROCK, senior member of the firm of Frank R. Blaurock & Son, Chicago, district sales agents for the Andrews Steel Co., Newport, Ky., died of heart disease Jan. 15. He had been actively connected with the iron and steel business in Chicago and Milwaukee for 40 years. He was a native of Madison, Wis., and was 63 years of age.

CHARLES W. GOODNOUGH, director and vice-president of the Stove & Range Co. of Pittsburgh, died at his home in Bellevue, Pa., Jan. 12. He was born in Pittsburgh, Sept. 24, 1859, and had been identified with the stove business for 25 years. He leaves his widow, two sons and four daughters.

ARCHER ANDERSON, president of the Tredegar Co., Richmond, Va., died two weeks ago. The company of which he was the head was established in 1836 and during the Civil War was one of the mainstays of the Confederacy in the manufacture of war material.

FREDERICK A. DRIVER, one of the founders of the Driver-Harris Co., Harrison, N. J., died Jan. 23 at the home of his daughter, Mrs. Arlington Bensel, East Orange, N. J. He was 82 years old and a native of London.

HENRY M. TAYLOR, vice-president and treasurer of the Remington Machine Co., Wilmington, Del., died suddenly at his home in Wilmington on Jan. 14. Death was due to heart trouble.

J. D. MACEWEN, who has been a successful carriage and automobile manufacturer for 50 years, died at Natick, Mass., Jan. 7, in his 72nd year.

LIEUT. WALTER L. FOULKE, treasurer of the C. Pardee Works, Perth Amboy, N. J., died at Camp Kelly, San Antonio, Tex., Tuesday, Jan. 8.

Immense Foreign Trade of the United States

WASHINGTON, Jan. 29.—The foreign trade of the United States amounted to over $9,000,000,000 in 1917, according to official figures compiled by the Bureau of Foreign and Domestic Commerce. This is a gain of nearly $1,300,000,000 over 1916, when the total trade amounted to $7,874,000,000, a figure never previously approached. Exports in 1917 reached a total of $6,226,000,000 while imports amounted to $2,952,000,000 showing a favorable trade balance of $3,274,000,000. The excess of exports over imports has nearly doubled in the last two years, amounting in 1915 to $1,776,000,000 and in 1916 to $3,091,000,000.

The significance of the foreign trade figures for 1917 will be better appreciated when they are compared with those for previous years. The record total of exports prior to 1916 was made in 1915 when the aggregate was $3,547,000,000. In 1914 the total was $2,113,000,000 and in 1913 it was $2,484,000,000. The total imports in 1915 were but $1,778,000,000, which was a small decrease from the previous high water mark of $1,792,000,000 recorded in 1913. The total imports of 1914 aggregated $1,780,000,000.

Exports during December made a surprising record, amounting to $589,000,000, an increase of no less than $100,000,000 over November. The imports for December amounted to $228,000,000, a gain of $7,000,000 over the previous month.

Republic Company Buys Coal Property

The Republic Iron & Steel Co. has purchased the Bessemer Coal & Coke Co.'s property in Alleghany county, Pennsylvania, consisting of about 3000 acres of coking coal, with two shaft openings fully equipped and a rated capacity of approximately 4000 tons a day. The purchase price is said to be about $3,000,000. The property was acquired by the Woodside Coke Co., a Pennsylvania corporation, and one of the subsidiaries of the Republic Iron & Steel Co., and ultimately the entire output of these mines will be applied on the account of the Republic company's fuel requirements.

The Canadian Government has decided, according to the *Canadian Mining Journal*, to license until further notice the free export of molybdenum, tungsten, their ores, concentrates and products to approved consignees in the United States and France. It is necessary for exporters to obtain a license from the Commission of Customs, Ottawa, previous to shipment, and from the Bureau of Imports, War Trade Board, Washington, D. C., a license to import into the United States.

STEEL CORPORATION EARNINGS

Extra Dividend of 3 Per Cent Is Again Declared on Common Stock

The report of the United States Steel Corporation for the last quarter of the year 1917 shows a further decline as compared with the preceding quarter. In fact, that has been the rule with each of the last three quarters of the year, but in spite of this fact the net surplus for nine months was $80,962,547, which after adding $10,545,202 for adjustment of provisions made for the first nine months of 1917 for estimated excess profits taxes and deducting $55,000,000 for account of expenditures made and to be made on authorized appropriations for additional property, new plants and construction, the balance of surplus for the year was $52,766,021. The war taxes have not been as high as was estimated. For the third quarter $63,733,013 was allowed for war income and excess profit taxes and for the fourth quarter the allowance was $60,950,364. It should be noted, however, that for the first quarter no deduction was made on account of war income and war excess profits taxes, while for the second quarter the allowance for these taxes was $53,918,872. The net earnings for the year after making war tax allowances were $331,633,075, compared with $333,574,177 in 1916 and $130,396,011 in 1915.

Judge Gary estimates that the full charges against earnings for the year for war taxes will be about $235,000,000.

An extra dividend of 3 per cent, the same as in the three preceding quarters, was declared on the common stock for the fourth quarter, in addition to the regular quarterly disbursement of 1¼ per cent, making the total dividend on common for the year 17 per cent. The directors also declared the regular quarterly dividend of 1¾ per cent on the preferred stock. The earnings for the past 12 quarters have been as follows:

	1917	1916	1915
First quarter	$113,121,018	$60,713,624	$12,457,809
Second quarter	90,579,204	81,126,048	27,950,055
Third quarter	68,243,784	85,817,067	38,710,644
Fourth quarter	59,724,125	105,968,347	51,232,788

Without making an allowance for the war taxes and interest on subsidiary companies' bonds, the earnings of the Steel Corporation for the four quarters have been as follows:

First quarter	$113,121,018
Second quarter	144,478,076
Third quarter	131,976,797
Fourth quarter	120,674,489
Year	510,250,380

Statement of United States Steel Corporation and Subsidiary Companies for the Quarter Ending Dec. 31, 1917

EARNINGS

	Earnings before charging interest on the subsidiary cos.' bonds outstanding	Less: Interest on the subsidiary cos.' bonds outstanding	Balance of earnings
October, 1917	$22,565,838	$729,847	$21,835,991
November, 1917	20,630,428	727,566	19,902,862
December, 1917	18,711,114	725,842	17,985,272
	$61,907,380	$2,183,255	
Total earnings after deducting all expenses incident to operations, comprising those for ordinary repairs and maintenance of plants, allowances for estimated proportion of extraordinary cost of facilities installed by reason of war requirements, also taxes (including $60,950,364 for account of war income and war excess profits taxes), and interest on bonds of the subsidiary companies			$59,724,125
Less, charges and allowances for depreciation, applied as follows, viz.:			
To depreciation and extraordinary replacement funds and sinking funds on bonds of subsidiary companies	$9,843,041		
To sinking funds on U. S. Steel Corporation bonds	1,845,740		
			11,688,781
Net income			$48,035,344
Deduct: Interest for the quarter on U. S. Steel Corporation bonds outstanding	$5,280,137		
Premium on bonds redeemed	189,966		
			5,470,103
Balance			$42,565,241
Add: Net balance of sundry charges and receipts, including adjustments of inventories and various other accounts			1,600,808
Total			$44,166,049
Dividends on stocks of the United States Steel Corporation, viz.:			
Preferred, 1¾ per cent	$6,304,920		
Common, 1¼ per cent	6,353,782		
	$12,658,702		
Extra dividend: Common, 3 per cent	15,249,075		
			27,907,777
Balance of surplus for the quarter			$16,258,272
Net surplus reported for nine months	$80,962,547		
Add, for adjustment of provisions made for first nine months of 1917, for estimated excess profits taxes	10,545,202		
			91,507,749
Total			$107,766,021
Less: Appropriated from surplus for account of expenditures made and to be made on authorized appropriations for additional property, new plants and construction			$55,000,000
Balance of surplus for the year			$52,766,021

Output of Chromite in 1917

The domestic production of chromite in 1916 was about 47,000 gross tons, and last spring the prediction was made by Government geologists that in 1917 it would reach 48,000 tons. According to J. S. Diller of the U. S. Geological Survey, the latest returns indicate that this prophecy has been fulfilled. The output of Oregon in 1917 was greatly increased, as well as that of Eldorado, Del Norte, and other counties in California. Washington and North Carolina have entered the list of producing States, and Maryland promises to become a larger producer. The output in 1917 included 1000 tons from Alaska.

Unfortunately for the United States, the present domestic output of chromite is scarcely one-fourth of the quantity needed for war and domestic uses, so that the other three-fourths must be imported. Hitherto most of our imported chromite has come from Rhodesia and New Caledonia, and, notwithstanding the scarcity of ships, much of it still comes from those distant lands. Canada has rendered the most efficient help. In 1916 she sent us 10,930 tons, and in 1917 more than doubled her shipments of chromite to the United States.

Fixation of Nitrogen Now a Large German Industry

The output of ammonia by the fixation of nitrogen from the air has grown to very large proportions in Germany since the war started. According to the London *Iron and Coal Trades Review*, the production of ammonia in Germany by the Haber synthetic process, according to a German daily paper, rose from 30,000 tons in 1913, to 60,000 tons in 1914, to 150,000 tons in 1915, and 300,000 tons (estimated) in 1916. An output of 500,000 tons of ammonia was anticipated in 1917, containing 100,000 tons of nitrogen; at the same time 700,000 tons of sulphate of ammonia (140,000 tons of nitrogen), and 400,000 tons of calcium nitrate (80,000 tons of nitrogen) was expected to be produced, the total containing 320,000 tons of nitrogen, which exceeds by 100,000 tons the entire consumption of nitrogen in Germany in 1913.

PERSONAL

Guy E. Tripp, who retired as chairman of the Westinghouse Electric & Mfg. Co. when he was appointed by the War Department as chief of the production division of the Ordnance Department and thereby intrusted with the task of supervising and stimulating the production of all ordnance supplies, has received a colonel's commission. His selection is regarded as arising partly out of his experience in the manufacture of munitions, the Westinghouse company having obtained large contracts from the British and Russian governments immediately on the outbreak of the European war. He is credited with bringing to the department the highest obtainable type of experience and ability to insure speedy and careful production of munitions. The board of directors of the Westinghouse company has given him a leave of absence for the duration of the war.

J. H. Foster, president of the Hydraulic Pressed Steel Co., Cleveland, has been appointed chairman of the War Industries Committee of the Cleveland Chamber of Commerce. This committee will open a Washington office and will co-operate with the various Washington departments and Cleveland manufacturers, with a view of furnishing the different departments with information as to products that can be made for the Government by the manufacturing plants of Cleveland.

Henry J. Fuller, vice-president Fairbanks, Morse & Co., and president Canadian Fairbanks-Morse Co., has been elected a director of the Liberty National Bank of New York.

Ben. D. Christian and D. B. Graze have been appointed to the sales department of the Crocker-Wheeler Co., Ampere, N. J., for its Cleveland district, succeeding Howard Dingle and W. W. Clark.

Henry Dreses, president, Dreses Machine Tool Co., Cincinnati, fell on an icy pavement last week, fracturing a knee cap. He will probably be compelled to remain in a hospital several weeks.

E. W. Edwards, president Edwards Mfg. Co., Cincinnati, has been re-elected president of the Cincinnati Rapid Transit Commission.

Eugene Seybold, a son of J. J. Seybold, superintendent Niles Tool Works Co., Hamilton, Ohio, and a former employee of that company, has been commissioned a captain in the Ordnance Department of the U. S. Army.

Charles S. Bilyeu, who became associated with the Gulick-Henderson Co., engineer, New York, several months ago, has been made assistant to the president.

Allen Breed, formerly with the Lodge & Shipley Machine Tool Co., Cincinnati, has resigned to accept a position as special sales engineer for the Brown & Zortman Machinery Co., Pittsburgh.

Frank Bartholomew, who has been erecting engineer for the Shaw Electric Crane Co. for the past 20 years and who resigned his position with that company in December, 1917, has become associated with N. B. Payne in the Havemeyer Building, 25 Church Street, New York, specialist in electric cranes.

The General Mfg. Co., Detroit, manufacturer of tools, jigs and fixtures, announces a change in officers due to a transfer of stock holdings. The new officers are: F. C. Hossie, president; M. G. Hossie, vice-president, and H. Wild, secretary and treasurer. F. C. Hossie has purchased all of J. R. Stone's holdings in the company. He has sold all of his holdings in the J. R. Stone Tool & Supply Co., with whom he has been identified for a number of years, and will devote his whole time to the interests of the General Mfg. Co.

Henry B. Hallowell, assistant manager Reed-Prentice Co., Worcester, Mass., has been commissioned captain in the Ordnance Department and will report at Washington this week. He was graduated from the Massachusetts Institute of Technology in 1906.

James M. Welch, tool foreman American & British Mfg. Co., Bridgeport, Conn., who has resigned to become an assistant superintendent of a department of the Bethlehem Steel Corporation, Bethlehem, Pa., was presented a gold watch, a purse and other gifts by the 500 men who have been working under him.

At a meeting of the Board of Directors of the Victor Tool Co., Waynesboro, Pa., Jan. 22, the following officers were elected for the ensuing year: H. C. Geist, president; Frank Barnett, vice-president; R. G. Mumma, secretary and assistant treasurer; and J. W. Warehime, treasurer.

Cameron C. Smith, president of the Union Steel Casting Co., Pittsburgh, who was recently appointed a major in the Ordnance Reserve Corps, has been assigned to the production department, carriage division of the Ordnance Department of the United States Army, and his headquarters will be in Washington, D. C.

Stephen J. Leonard has been elected a director of the Central Foundry Co., Newark, N. J., to succeed W. L. Kluttz, resigned.

Joseph N. Pew, Jr., has been elected president of the Sun Shipbuilding Co., Chester, Pa., to succeed his brother, J. Howard Pew, who assumes the vice-presidency, the position vacated by the former.

Clarence R. Vogt, son of Adam Vogt, president of the Vogt Brothers Mfg. Co., Louisville, and formerly manager of the company, is now in Federal service. He has been stationed at the Frankford Arsenal at Philadelphia since June and has just been promoted from first lieutenant to captain, U. S. R.

William Piggott of Seattle, Wash., president of the Seattle Car & Foundry Co., and vice-president of the Pacific Coast Steel Co., has been named to take charge of wooden shipbuilding for the United States Shipping Board in the Seattle district. Mr. Piggott will succeed Capt. J. F. Blaine, who will retain charge of the steel ship construction in Seattle.

Harry G. Steele, Pittsburgh Transformer Co., Pittsburgh, will address the Philadelphia section of the Association of Iron & Steel Electrical Engineers on the evening of Feb. 2 at the Majestic Hotel, Philadelphia, on "Mill Type Transformers."

The appointment of Waldo H. Marshall, New York, formerly president of the American Locomotive Co. and now associated with J. P. Morgan & Co., to be assistant chief of the division of production of the Ordnance Department at Washington, has been announced by Col. Guy E. Tripp, chief of that department. Mr. Marshall has had a wide experience in manufacturing, and his appointment marks another step in the recently adopted policy of appointing civilians to important posts in the War Department.

An appointment as major in the Ordnance Reserve under Adjutant General McCain at Washington has been received by H. C. Hequemborg, former purchasing agent for the American Locomotive Co. at Dunkirk, N. Y.

Alfred W. Dow, formerly with the Pacific Hardware & Steel Co., San Francisco, has opened sales offices in that city for the purpose of representing eastern manufacturers. He will deal in finished steel products, pig iron, coke, ferroalloys and non-ferrous metals.

W. L. Lindsley, for the past year in charge of the Detroit office of the Trumbull Steel Co. of Warren, Ohio, has been transferred to the New York City sales force of the company. Until his successor has been

appointed, the Detroit office will be in charge of a representative from the main offices in Warren. The Trumbull Steel Co. has discontinued the arrangement it had with the John S. Worthington Co., Denver, Col., and as yet has not made any new appointment to fill the vacancy.

George E. Shaw has been elected a director of the Crucible Steel Co. of America, Pittsburgh.

Big Jump in December Fabricated Business

The cumulative effect of the business distributed to the fabricators of the country growing out of the fabricated shipbuilding program is noted in the records of the Bridge Builders & Structural Society. In September of last year the rate of contracting had fallen to 29 per cent of capacity, representing 52,000 tons of structural work and then in the succeeding three months, 111,000, 138,500 and 205,000 tons, successively, were contracted for. This last figure corresponds to 114, the percentage figure of the society.

The figures show that the last three months covered 35 per cent of the contracting for the entire year. The period corresponds to that two years ago when fabricating interests were being pushed to take on building contracts for industrial plant expansions resulting from the foreign war demand. In December, 1915, for example, the volume of business was 208,500 tons. The total number of tons of bridge and building work placed with the fabricators in 1917 amounted to 1,286,000, which compares with 1,500,000 tons for each of the years 1915 and 1916 and 1,080,000, the amount in each of the years of 1913 and 1914.

The Bridge Builders and Structural Society held its annual meeting on Jan. 18. From the report of Secretary George E. Gifford is taken the following: "Due to the influence of this society, practically the whole fabricating industry has united in proffering aid to the Government. As long ago as last May, our men saw that our assistance would be needed and formed a 'war aid committee,' which, in spite of discouragements, was continued, with some changes of plan, until it was seen that it had outgrown this society and should be representative of the entire independent industry. It then called a convention of fabricators, which met in Pittsburgh on Nov. 27, and the aid of the industry was enthusiastically pledged. The organization, called the Steel Fabricators of the United States, which was there formed, now represents almost the entire independent capacity of the country, not only of structural shops, but also of plate and tank shops. Headquarters have been established in Washington and a secretary installed therein, giving constant attention to the requirements of the Government and the interests of the fabricators.

"The period of depression which has followed the entrance of the United States into the war, causing the practical suspension of all the commercial business in fabricated steel, has resulted in the sales for the year 1917 falling considerably below those for the years 1915 and 1916. Our figures for the year, compiled from reliable sources with which you are all familiar, show that the total sales of fabricated steel for the year 1917 amounted to 1,285,000 tons as against about 1,500,000 tons for both 1915 and 1916. This amount is probably less than it should be because the collecting with accuracy of statistics on fabricated ships seems to be well nigh impossible.

"The work of the society during 1917 went on with little or no change so far as the operation of the open price plan with its attendant reporting features are concerned. The present rules seem to be well established and satisfactory to all our members. Attempted extensions do not meet with much favor.

"A year ago the ruling prices for plain material were 3.10c. for shapes and 3.60c. for plates, Pittsburgh base. From that time they advanced through various steps to an asking mill price of 4c. for shapes and 4.50c. for plates, but with actual quotations for plates anywhere up to 10c. and 12c. per per pound with most quotations based on an average of about 6c. In the fall the Government stepped in and fixed the prices for plain material at 3c. and 3.25c. base, Pittsburgh and Chicago. These prices have been accepted without demur by the mills and are the ruling base prices to-day. The effect of fixing of prices has not stimulated materially general buying, but this is due to Government priority requirements which make it almost impossible for the general purchaser to secure deliveries, as well as the financial situation which makes it difficult or impossible to secure capital for commercial or speculative building."

Statistics of American Merchant Marine

WASHINGTON, Jan. 29.—The American merchant marine on Jan. 1, 1917, comprised 37,894 vessels of five tons net register or over and had a total gross tonnage of 12,250,000 tons, according to a report of the Census Bureau just made public here. The geographical distribution of this gross tonnage was as follows: Atlantic Coast and Gulf of Mexico, 6,509,000; Mississippi River and its tributaries, 1,621,000; Pacific Coast, including Alaska, 1,186,000; Great Lakes and St. Lawrence River, 2,738,000; canals and other inland waters, 196,000. The distribution according to method of propulsion was: Steam and other power, 6,098,000; sail, 1,089,000; unrigged, 5,063,000.

The increase in number of vessels as compared with 1906 was equal to only 1½ per cent, and the gross tonnage shows a decrease amounting to 5 per cent. This is accounted for by the marked falling off in number and tonnage of sailing vessels and in tonnage of unrigged craft. The former show a decrease in number from 7131 to 2979, or 58 per cent, and in gross tonnage from 1,704,000 to 1,089,000, or 36 per cent.

Despite the very small increase in number of vessels and the falling off in total gross tonnage throughout the country as a whole during the 10-year period, the figures for value of vessels, gross income, wages paid, and freight carried show marked increases, amounting to 89 per cent, 91 per cent, 44 per cent, and 42 per cent, respectively. The number of employees, however, increased by less than 9 per cent, and the number of passengers carried shows a decrease of not quite 10 per cent.

Society for Ohio Safety Engineers

At the annual meeting of the Society of Ohio Safety Engineers, held at the rooms of the Cleveland Engineering Society, Cleveland; Jan. 22, officers for the ensuing year were elected as follows: President, J. M. Woltz, safety director of the Youngstown Sheet & Tube Co., Youngstown, Ohio; vice-president, A. C. Cook, Carnegie Steel Co., Youngstown; secretary and treasurer, G. S. Hodgson, Republic Rubber Co., Youngstown.

During its business session, the society discussed the various codes that are pending in Ohio, including lighting, sanitary, yard and general codes, and decided to devote more attention to efforts to have these codes finally completed and adopted.

After the business session, a banquet was held, and this was followed by a meeting with the Cleveland Engineering Society, during which papers relating to safety work were presented.

The H. M. Lane Co., Detroit, Mich., foundry engineer, announces that A. O. Thomas, inventor of the Thomas reinforced concrete system, has joined its organization, giving it greater facilities for reinforced concrete design. H. E. Mills, until recently general draftsman in the office of the works engineer of the Buick Motor Co., Flint, Mich., has also joined the staff of the H. M. Lane Co. Announcement is made that the core and mold ovens devised by H. M. Lane and heretofore built by the Holcroft & Lane Co. will now be built by Holcroft & Co., which will continue as a purely contracting organization. In the past year Holcroft & Co. have built 12 open-hearth furnaces, about 70 miscellaneous metallurgical furnaces and more than 100 core and mold ovens.

Cutting Down Production the Chief Aim

Garfield Order Has Had Little Effect on Railroad Situation—Gain in Fueling Ships—Overtime Proclaimed a Violation

WASHINGTON, Jan. 29.—The gradual subsidence of the storm which centered about the Fuel Administration early in the past week has given an opportunity for a dispassionate appraisal of results and for a forecast of the situation that will prevail during the remainder of the period embraced in the Garfield edict for an industrial shut-down on Mondays. While the closing order is now regarded as likely to remain in force until March, if not for the entire period covered by the original ruling, thousands of business men from all parts of the country have been in Washington during the week urging special exemptions and the Fuel Administrator and his assistants have been obliged to remain on duty night and day to confer with these visitors.

Fueling Ships the Chief Gain

According to Fuel Administration officials the effect of the five days' shutdown beginning Jan. 17, was almost completely neutralized by a snowstorm of unprecedented severity covering a wide area east of Chicago, and the only net gain from the war-making standpoint was the diversion of relatively small quantities of coal from industrial uses to the bunkering of ships lying in Atlantic harbors. The gain in bunker coal tonnage was very small, however, and the industrial saving of coal to the extent that any net economies resulted must be attributed to smaller drafts on coal supplies already in the possession of the manufacturing plants of the country. This saving the Fuel Administration counts upon to aid in relieving the situation later in the season.

The higher temperatures which have prevailed in the eastern part of the country during the past few days, taken in connection with Director of Railroads McAdoo's embargo on all freight except food, fuel and war material, have been the salient factor in bringing about a substantial improvement in conditions. The domestic demand for coal has declined sharply with the advent of warmer weather and it has been possible to divert a considerable tonnage of both anthracite and bituminous from domestic to industrial uses. The freight embargo has released large numbers of locomotives and cars on the Pennsylvania, Baltimore & Ohio, and Philadelphia & Reading railroads and as much of this equipment as possible has been sent to the mines to move coal. The freight embargo on the lines referred to has not put a full stop to the shipments of miscellaneous merchandise, however, as a very large amount of traffic originating in Chicago, Pittsburgh, St. Louis and other manufacturing centers has found its way to the Atlantic coast over the New York Central, the Chesapeake & Ohio, and the Southern railroads. The experience of the week has clearly demonstrated that a general freight embargo rather than a shutdown of manufacturing plants was what was really needed to meet the situation which Dr. Garfield's order was designed to remedy.

For the purpose of suspending penalties that may accure on Government contracts because of the inability of manufacturers to operate on "heatless" days, Representative Robbins of Pennsylvania has introduced a resolution which has been referred to the House Judiciary Committee, providing that in every instance where the completion of a contract within the time specified for delivery has been prevented by the order of the Fuel Director suspending the operations of the plants in which said goods were being made, the penalty clause of such contracts shall be suspended during the period of cessation of operations and the time therein extended for such additional time as the suspension order was enforced against said contract.

Overtime a Violation of Order

Almost insuperable difficulties encountered by many industries in obeying the heatless Mondays order were described to Dr. Garfield and his aides by many manufacturers immediately after the five-day shut-down and based upon actual experience during that period. In almost every case, however, the Fuel Administrator turned a deaf ear to these representations and after several protestants had told him that in their individual cases the Monday closing order would save no coal but rather result in increased consumption because of the necessity of working overtime during other days of the week, he summoned a secretary and dictated the following statement, which he ordered to be telegraphed to all State fuel administrators:

> Any increase of the working time on other days of the week by industrial establishments for the purpose of making up the lost time brought about by the Fuel Administration's order prohibiting work on Mondays will be considered by the United States Fuel Administrator as an evasion of that order and a violation of its spirit.

Production Must Be Cut

Supplementing this announcement Dr. Garfield's aides informed callers at the Fuel Administration headquarters that the chief object in issuing the heatless Mondays order was to cut production rather than to conserve coal and that the Fuel Administrator expected every manufacturer to reduce his output and not to seek to make it up by any device, whether or not such measures involved increased consumption of heat, light or power on other days than Mondays. Emphasis was also put upon Dr. Garfield's original appeal to manufacturers and employers everywhere to pay their idle employees and not to permit the burden to be borne by labor. Many of the protestants who succeeded in reaching Mr. Garfield urged that if manufacturers were expected to pay for idle time on Mondays they should be permitted to work overtime and to employ other devices to increase their output in all cases where it could be shown that no substantial consumption of coal was involved and especially in plants which must be kept warm and which could be operated at very slight additional fuel expense. To all these appeals, however, Dr. Garfield replied that his purpose was to reduce production as well as save fuel and that no concessions could be made. As one of his aides expressed it, "Dr. Garfield has set his teeth in this thing and he means to go through with it 100 per cent."

Acting under the blanket authority conferred upon them by Dr. Garfield, several State fuel administrators ordered the closing of the majority of the churches for periods varying from three to eight weeks, the suggestion being made that the number of services be substantially reduced and all congregations of the various denominations concentrate in a small number of churches during the prescribed period. The announcement of this move was promptly followed by protests telegraphed to Washington and later supplemented by the arrival here of clergymen and others who, after learning from the Fuel Administrator that the closing of churches was entirely within the discretion of the State administrators, demanded that all theaters, moving picture houses, etc., throughout the country should be reduced to the same basis. The Fuel Administrator declined to rule on this demand, holding that this phase of the subject must be treated from the standpoint of local conditions and could only be discriminatingly handled by State administrators. Theatrical managers, learning of the action of the clergymen, filed formal protests against the closing of the play-houses and reminded the Fuel Administrator that the Government

is in receipt of a very large revenue from the tax on admissions and, further, that the theaters are "doing their bit" in closing down on Tuesdays during the prescribed period. In this connection Dr. Garfield was forced to administer a rebuke to the Food Administrator. One of the leading Washington theaters, scheduled to close on Tuesday, was brilliantly lighted and very well warmed during the afternoon and night of Jan. 22 for the benefit of several Food Administration officials who lectured upon the necessity of conserving wheat and other food products for the Allies. Another similar meeting was scheduled for to-night, but Dr. Garfield ordered the theater closed, reminding the Food Administration that the Government must "practice what it preaches."

Automobiles Are Exempt

Much uncertainty has prevailed throughout the country as to whether the order prohibiting the use of fuel on Mondays by manufacturing establishments, stores, etc., was intended to prevent the operation of automobiles, whether used for business or pleasure purposes. In order that the position of the Fuel Administration might be understood in this regard, especially with reference to trucks operated in the movement of freight and general supplies, Dr. Garfield issued the following statement:

> There is nothing in the order of Jan. 17 to prevent the operation of automobiles, motor vehicles of all classes being considered as coming under the head of public utilities. In keeping with this ruling, garages have been exempted.

All Fuels Covered by Order

Many inquiries were received at Fuel Administration headquarters from persons who desired to know whether oil could be substituted for coal as fuel with which to enable small manufacturing plants to be heated on Mondays. In reply the officials pointed to the fact that the order is not limited to coal but includes every kind of fuel and in this connection it was again emphasized that the Fuel Administrator desired not only to conserve fuel but to curtail output.

Very few exemptions were added during the week to the list published in THE IRON AGE last week. In a number of cases manufacturers having contracts with the War and Navy Departments and with the Shipping Board were able to obtain special dispensations covering the production of special articles greatly needed for war purposes. The majority of these concessions, however, were merely enlargements of exemptions previously granted.

Zone System of Coal Distribution

As a war measure for the relief of the general coal shortage and to systematize the future distribution of bituminous coal the Fuel Administration has divided the country into 20 districts each of which is to be supplied from mines located therein. The zone system is said to have been successful in England and its application here, it is believed, will save thousands of miles of transportation and insure a speedier movement of coal to the consumer. Cross-hauls will be eliminated and this item alone is regarded as one of the most costly practices in the coal industry.

In addition to prescribing the bituminous zones, the Fuel Administrator will appoint a district representative in each, selecting in all cases men who are either operators or who are thoroughly familiar with coal production. They will allot orders received from State fuel administrators and will be responsible for prompt movement of coal out of the producing fields. The chief difficulty with the zone system is expected from the demand for specific grades of coal. Certain districts producing particular grades have found markets far from their mines and this will have to be reckoned with in working out a plan of operation. It is understood that special permits will be required for shipments of coal beyond the limits of the zone in which it is produced. While the boundaries of the various districts have not yet been announced it is understood they will be formed along State lines and consumers as well as producers will be required to observe them closely. Anthracite is not included in the zoning plan because most of it is mined in a narrow strip of territory in Pennsylvania.

The Fuel Administrator announces that to prevent a situation next winter similar to the one that has now forced a shutdown of industries, a plan will be adopted involving the creation during the summer of large reserves in every consuming center. Domestic requirements, for several months if not for an entire year, will be supplied early in the summer and reserve stocks will thereafter be accumulated as rapidly as possible.

J. D. A. Morrow, a coal association man of long experience, has been appointed by Dr. Garfield to be manager of apportionment and distribution. Mr. Morrow will have general charge of the entire fuel movement from producer to consumer except as to petroleum. This appointment is made in accordance with the general plan of centralizing the authority and the lines of report at headquarters.

Coal Production in 1917

The United States Geological Survey has made public an advance bulletin showing the production of bituminous coal in December, 1917, and during the calendar year. The figures for December, which include lignite and coal made into coke, place the bituminous output at 42,143,000 net tons. Severe cold and snow impeding traffic on railroad systems already congested with an unprecedented burden of freight and retarding surface operations at the mines caused the December production to drop more than 5,000,000 tons below that of November, reaching the lowest level since April, 1917, when a production of 41,813,000 tons was reported. The average production per working day during December was 1,685,702 tons, a decrease of 10 per cent when compared with November, 1917, and of 4.4 per cent when compared with December of the preceding year.

The production for the calender year 1917 amounted to 544,262,000 net tons. This was an increase over 1916 of 41,743,000 tons or only 8.3 per cent. The expected increase of 10 per cent foreshadowed by the Survey in October might have been attained had it not been for the storms of mid-December. The increase of the 1917 output over that of 1915 was very much larger, amounting to 101,637,000 tons or 23 per cent.

Beehive and By-Product Coke

December's production of beehive coke is estimated at 2,420,143 tons, an average per working day of 96,806 tons. The lowest daily average recorded before in any month during the last two years was 103,268 tons in February, 1917. The total beehive output for the year was 33,994,833 net tons, or 1,470,000 tons less than for 1916. The decrease, amounting to 4.3 per cent, occurred simultaneously with an increase in the demand for coke, and is to be accounted for in part by the effect of car and labor shortage in limiting output, but chiefly by the successful competition of by-product coke. Preliminary estimates place the production of the latter at 22,600,000 tons, a gain of 3,531,000 tons over 1916, or 18.5 per cent. By-product ovens have thus not only supplied the additional consumption induced by the growth of industry but have displaced nearly 1,500,000 tons formerly supplied by beehive ovens. The total output of coke, including both beehive and by-product, is estimated as 56,600,000 net tons. Of this, beehive coke constituted 60 per cent and by-product 40 per cent.

The Gompers Seven-Hour Day

There has been much sharp criticism here of the declaration reported to have been made by Samuel Gompers, president of the American Federation of Labor, at Indianapolis on Jan. 23, that a universal seven-hour day for the period of the war should be ordered and would conserve coal and relieve railroad congestion to a greater degree than the adoption of heatless Mondays. Mr. Gompers's friends here assert that his statement is misrepresented in the press dispatches from Indianapolis and that he did not refer to the period of the war but merely to the period during which the industries of the country are to be shut down on Mondays. This explanation would be more

generally credited were it not for the fact that, in spite of the great emergency existing and the necessity for maximum production, Mr. Gompers and other labor leaders have taken advantage of the situation to urge the eight-hour day and other measures calculated to reduce rather than increase output. It is the opinion of those in a position to form reliable judgments that the weekly per capita production of skilled labor has steadily declined since the United States entered the war.

W. L. C.

NEW COMMITTEE FOR SCRAP

Producers, Distributers and Consumers Are to Be Represented—Old Committee Resigns

The iron and steel scrap business of the country will be placed under the control of a committee of producers, dealers and consumers. Last week the Sub-committee on Scrap Iron and Steel of the American Iron and Steel Institute resigned in a body as a preliminary to the organization of the new committee, members of which will probably be selected this week. The committee which resigned consisted of Eli Joseph, Joseph Joseph & Bros. Co., New York; Samuel Deutsch, Ohio Iron & Metal Co., Chicago; Joseph Michaels, Hyman, Michaels Co., Chicago, and W. Vernon Phillips, Perry, Buxton & Doane Co., Philadelphia.

There is a serious shortage of scrap and it was the opinion of the members of the Committee on Steel and Steel products of the American Iron and Steel Institute, of which Judge E. H. Gary is chairman, that co-ordination of all elements of the scrap business—producers, distributors and dealers—would help to relieve the shortage.

A meeting was held in New York on Tuesday, Jan. 22, which was attended by representatives of the various interests and a frank discussion of the scrap situation revealed that the control of prices has worked in several ways to restrict trading. In addition there have been the natural restrictions due to cold weather, snow and railroad congestion. Moreover, the shortage of pig iron has caused a large demand for scrap, which dealers have not been able to satisfy.

Scrap Not Coming Out Freely

Owing to the intricacy of the scrap business and its many ramifications, Government control has not proved as successful as in pig iron and steel products. Speculation has always been the life of the business, and with this factor removed by the fixed prices, scrap has not, to use a trade term, been "coming out" as freely as might have been the case without such control.

The thousands of small dealers in villages and cities who gather the scrap have been slow to accustom themselves to the new order of things. Many of them have undoubtedly hoarded stocks in the belief that an eventual scarcity would work to bring higher prices despite the maximums fixed by agreement between the Government and dealers and consumers. Care was taken not to fix the maximum prices too low, but despite the liberality of these prices, in comparison with pig iron and the products of iron rolling mills, many dealers and producers have not been in a hurry to sell.

Some distributers believe the scrap is to be had and that such measures may have to be taken as are effective in Germany, where a war metals committee was appointed to discover where scrap could be obtained. Others incline to the belief that there is a real scarcity and that there will not be, even under favorable conditions, sufficient scrap to supply the demand for it as long as the war lasts.

Isolated Plants Suffer

Isolated plants have suffered more severely from the shortage than those plants which are favorably located as to freight rates. As all fixed prices are f. o. b. consumer's mill, the producer or dealer naturally desires to ship to the nearest consuming point. The Cambria Steel Co., at Johnstown, Pa., has suffered because it is not permitted to pay more than mills in the Pittsburgh district and scrap coming from the West naturally stops at Pittsburgh. Likewise scrap from the East seldom gets farther west than steel plants located at Coatesville, Pa., or nearby points. The N. & G. Taylor Co., Cumberland, Md., and the Whitaker-Glessner Co., Portsmouth, Ohio, are other companies whose plants have suffered from scrap shortage by reason of their location.

The suggestion has been made that all prices on scrap be changed to f.o.b. shipping point instead of f.o.b. consuming point, but it is doubtful whether such a change will be made as it would upset all the traditions of the business and probably lead to further complications.

The contention of the Committee on Steel and Steel Products of the American Iron and Steel Institute maintains that the 3½ per cent commission, which may be paid to recognized dealers or brokers for purchasing material, must not be applied in purchasing scrap from a dealer's yard. The committee holds it to be the duty of every consumer of scrap to scrutinize his bills of lading and ascertain the shipping point of every consignment, so that there may be no violation of this provision.

An effort will be made by the new committee to straighten out the many tangles that have helped to cripple the free movement of scrap. Suggestions have been made for further clarification of prices, but THE IRON AGE is informed that there is no immediate prospect that such action will be taken.

Striving for Greater Output of Ships on Coast

SEATTLE, Jan. 29.—Pledging the Government the constructive loyalty and limit capacity of the shipbuilding forces of the Pacific Northwest, 60 representatives of the steel shipyards of Washington and Oregon now building steel ships exclusively for the Government recently held a session in Seattle, called by Capt. J. F. Blain, district representative of the United States Shipping Board in the Northwest. The chief purpose of the convention was to make an effort to standardize as nearly as possible all the operations of the steel shipyards now building for the Government in the Northwest.

More than a month earlier than in previous years Alaska cannery supplies for the season of 1918 have begun to move and steamships going north are besieged with applications for space. From indications the canneries will handle a record pack for 1918, and provisions for handling this trade are now under way.

It is estimated that considerably more than $25,000,000 changed hands during 1917 in timber deals of different kinds. For the year 1918 it is the belief that all records will be broken, because of the immense demand for shipbuilding and airplane purposes.

The first shipment of the 20,000 skilled mechanics to be sent to Seattle to work in the shipyards recently arrived in this city, where they will be speedily given employment in the local yards. Skilled mechanics are extremely scarce in this section, although the supply of unskilled labor is plentiful.

Boston Molders Strike

About 1500 molders are on strike in the Boston Metropolitan district of eastern Massachusetts following refusal of a demand for $5 a day for an eight-hour workday. Later the demand was changed to $5.50 a day for a nine-hour day, which is the time now worked. The employers offered to meet the men half way but this was not accepted. Conferences are going on and a prompt settlement is likely. The previous rate was $4.50 for a nine-hour day. The strike leaders are quoted as saying that this is the beginning of a general movement on the part of the metal trades to secure the same wages and working conditions as prevail on the Pacific Coast. Investigation does not show that there is any intention to make the movement general among the other branches of the metal workers.

MORE BILLIONS NEEDED

Further Excess Profits Taxes Planned—Increase in Tariff Duties Opposed

WASHINGTON, Jan. 29.—A sharp division of opinion has arisen between the majority leaders of the House Ways and Means Committee and those of the Senate Finance Committee on the question of amending the excess profits tax law by special legislation. Senator Simmons of the Finance Committee has expressed his readiness to consider promptly any recommendations made by the Treasury Department for amendments to straighten out the numerous inconsistencies and obscurities in the statute, and the impression has been strong that this would be done in connection with the bill now pending repealing the exemption of the salaries of Senators and Representatives from the excess profits tax. Chairman Kitchin, however, is now out in a formal statement in which he foreshadows the enactment of further taxing legislation in the near future and advocates deferring all amendments to the act of Oct. 3, 1917, until the new revenue measure is brought forward.

The Commissioner of Internal Revenue has made a most extraordinary effort to render consistent and rational the general provisions of the excess profits tax by a series of arbitrary rulings suggested by the board of advisers appointed some time ago for this purpose. From time to time announcement has been made that it would be practicable to execute the law in accordance with these forced instructions, but when the United States Supreme Court invalidated the stock dividend ruling of the bureau it was decided to ask Congress to amend the excess profits tax and thus avoid tedious and costly litigation which might tie up large amounts of revenue for the entire period of the war. Mr. Kitchin, however, is very reluctant to initiate any amendatory legislation and in connection with a highly important declaration with regard to the necessity for increased taxation, says:

> The fiscal affairs of the United States indicate that, notwithstanding the large revenue to be derived from the present law, it will be necessary for Congress to provide new tax levies. Just what form the new levies will take, or the particular line of business that will be affected, cannot be anticipated. The entire situation will have to be canvassed thoroughly.
>
> In view of the apparently unquestioned need for additional revenue from taxes, it does not appear to be wise to consider at this time amendments to the present law. I am, of course, agreeable to remedying any administrative defects which the study and analysis of the war revenue act may develop, and will be willing at the proper time to introduce any such relief measure.
>
> It is my idea, therefore, to let the bill operate for a time, and in the meantime give a very careful study to our fiscal situation and future possible needs for money, so that any bill introduced will contain in a consolidated manner the additional fiscal program. Whatever difficulties may be encountered in the practical administration of the present law can best be presented to Congress after the Treasury Department has tried out the law under such regulations as may seem to the department to be practicable and within the law. When the true facts are presented from such a test Congress can provide for the remedial legislation.

The difficulty with Mr. Kitchin's suggestion lies in the fact that it will be impossible for the department to determine whether the statute can be administered "under such regulations as may seem to be practicable and within the law" until all questionable rulings have been tested in the courts. This would involve a delay of at least two years in the case of every decision carried to the United States Supreme Court. Further, it is quite apparent that unless Congress immediately amends the excess profits tax law the modifications will not be made in time to affect tax payments for the year 1917 or the preparation of the tax returns which must be filed with the Commissioner of Internal Revenue on or before March 1, next. In fact, it is now practically certain that no measure can be put through both houses and signed by the President in time to be effective as to the tax returns for 1917; hence, as the result of departmental hesitation and the reluctance of Congress to disturb the act of October, 1917, it may be necessary for the Government to make refunds in hundreds of thousands of cases should the courts disagree with the arbitrary rulings heretofore made.

Neither Chairman Kitchin nor any of his colleagues is willing to indicate the additional sources of taxation which are to be resorted to to provide more revenue. Under existing laws taxation is now producing about $4,000,000,000 per annum, but this amount will hardly exceed 20 per cent of total current expenditures, including loans to the Allies, and already plans are being made for another big Liberty loan which may run as high as five billions. It seems probable that the new taxation program will include further levies on incomes and excess profits, consumption taxes on sugar, tea, coffee, cocoa, etc. A strong effort will be made by a certain contingent in both houses to increase the tariff duties, but this will be opposed by the Tariff Commission and the outcome is problematical. W. L. C.

Draftsmen, Clerks and Others Needed by the Government

The Bureau of Ordnance, Navy Department, is in need of competent draftsmen. Men who are graduates in mechanical engineering from technical schools or colleges of recognized standing and have had some drafting room experience, or men who are competent designers of heavy machinery, engines or shop tools, and have had a number of years drafting room experience, are eligible for these positions. The pay ranges from $4 to $6.88 per day, depending upon the qualifications of the draftsman. There are at present a number of vacancies in the rating of draftsman at the Washington Navy Yard. Additional information may be had by addressing the Commandant and Superintendent, Naval Gun Factory, Navy Yard, Washington.

The Ordnance Department of the Army is also urgently seeking men to serve the Government at once. Positions open include 2000 stenographers and typewriters, men and women, salaries ranging from $1,100 to $1,200 a year; 2000 typewriter operators, men and women, salaries from $1,100 to $1,200; 2000 general clerks, salary $1,100, and many index and catalog clerks, engineers of tests of ordnance, machinists, mechanical draftsmen and inspectors. Applicants are requested to address John A. McIlhenny, president U. S. Civil Service Commission, Washington.

Brazilian Manganese Shipments Stopped

Shipments of manganese ore from Brazil are temporarily held up. Reliable advices are that the Brazilian Government recently suspended transportation of minerals on the Central Railway, which it owns, owing to a shortage of fuel with which to operate. This is the road which brings to tidewater most of the Brazilian ore destined for this country. Importers in the United States have been advised to send no vessels to load manganese ore purchased on contract, as it is not available in sufficient quantity at the shipping port and, while present conditions exist, cannot be brought from the mines to the port. Imports in 1917 from Brazil were probably not far from 550,000 gross tons and constitute the mainstay of the standard ferromanganese industry of this country.

Discussing developments in Los Angeles in 1917, Arthur W. Kinney, industrial commissioner of the Los Angeles Chamber of Commerce, says that not less than six companies have introduced electric furnaces for various purposes in the year and that the Union Tool Co. of Torrance has installed an open-hearth furnace, making a total in the Los Angeles district of three companies thus equipped.

Eight-Hour Day for Railroad Labor

Effects of Adamson Law Discussed by Goethals Commission — Few Changes to Short Shifts Have Been Made

WASHINGTON, Jan. 29.—While the extraordinary conditions prevailing during the past six months have made it impossible for the Goethals Eight-Hour Commission to report conclusive findings concerning the practical operation of the eight-hour day for railroad labor prescribed by the Adamson law, nevertheless some exceedingly valuable information having a broad bearing on the general transportation problem is embodied in a report which has just been forwarded to Congress. The commission makes it clear beyond controversy that the Adamson law is not in effect an eight-hour statute, but merely supplies a basis for a higher wage scale; that the increased expense imposed upon the railroads of the country exceeds $60,000,000 per annum; that, while it would be possible to reduce the average railroad labor day by certain changes in equipment, this would involve an enormous expense for larger engines, heavier rails, etc., and that, generally speaking, under reasonable conditions of transportation practice, a strict eight-hour day is unattainable.

An Elaborate Document

The report, which is signed by General George W. Goethals, chairman, E. E. Clark and George Rublee, is an elaborate document of more than 500 quarto pages, embracing the results of an exceedingly exhaustive investigation. Concerning the application of the eight-hour day, the commission finds that while it has not governed the hours of actual employment, it has been used as a basis for reckoning the compensation of engineers, firemen, conductors, assistant conductors, baggagemen, brakemen, flagmen in road and yard service, and hostlers. The average number of the employees in these classes, including a small number classified as "other road train employees," was 308,373, which was 17.37 per cent of the total number of railway employees. These figures refer only to roads having annual operating revenues of more than $1,000,000.

At the time the eight-hour law was being considered there was much speculation as to the extent of its probable effect upon railroad operating costs, and this became a matter of great interest to shippers, as it was a foregone conclusion that the public must ultimately pay this bill. Obviously, the increase in cost in absolute figures will vary from year to year with the volume of traffic and in this connection it is only possible to state what the increase would be if the percentages derived from observations during a limited period are applied to a year's business. Taking a single month in 1917 and comparing the schedule of wages with that in force for the corresponding month of 1916 upon railroad systems aggregating 104,355 miles of road, the commission has compiled some interesting statistics. These figures show an increase in compensation in the passenger service of 2.73 per cent, in freight service of 15.028 per cent and in yard service of 24.59 per cent. If these percentages are applied to the total compensation paid to these same classes of employees during the calendar year 1916, the following estimate of total increase in wage cost results: Passenger service, $2,532,097; freight service, $31,668,998; yard service, $27,333,437; total for the United States, $61,534,532. This does not include increases paid to hostlers, which would amount to about $1,875,000 additional.

Change to Short Shifts Limited

Actual experience has demonstrated that in the yard service only has there been any general change to eight-hour shifts. Reports covering 175,744 miles of road showed that 11,390 yard crews had been placed on eight-hour shifts and 3486 were still working longer than eight hours. To what extent this change will be permanent the commission does not venture an opinion, but a reduction in hours means to the men that they do not individually get the wage increase indicated above, and in some cases it means a considerable decrease, as where men formerly working 12 hours now work eight hours for the former 10 hours' pay. To the carriers, however, the reduction in hours does not necessarily mean an escape from all the increased cost shown above. With a 25 per cent increase in pay per hour, the total labor cost must be increased unless the total number of man-hours required for a given amount of switching is reduced through increased efficiency.

One of the most interesting features of the report relates to the average hours of actual service of railroad employees in the running of engines and trains. There had been so much discussion based upon allegations that railroad employees were required to lose much time while not actually working or drawing pay that the commission at first undertook to make a distinction between elapsed time and actual time. The former is computed continuously from the time the employee is required to report for duty at the beginning of the run or day's work until final release at the end. Actual time on duty is the elapsed time less any period of one hour or more during which the employee is not actually on duty or not held for duty. The reports of the carriers demonstrated, however, that except in short turn-around and suburban passenger service the elapsed time and actual time are not as a rule substantially different.

The statistics gathered in this connection, showing the average hours on duty per run, are very significant and demonstrate conclusively that the so-called eight-hour day does not apply to train service. The reports for 2286 freight engineers in both slow and fast freight service in the Eastern district show that 1040, or 45.5 per cent, were on duty for periods aggregating somewhat less than 260 hours per month, the equivalent of 10 hours per day for 26 days, and 1246, or 54.5 per cent, were on duty 260 hours or longer during the month. Those working 340 hours or longer, the equivalent of 11 hours a day for 31 days, were 233 in number, or 10.2 per cent of the total number considered.

What Is Practicable?

In summarizing its conclusions the commission, in adopting a report by one of its experts, says that in any discussion of the practicability of an actual eight-hour day for employees in railroad train service a distinction must be made between what is physically possible, if necessary to be done at any cost, from what is practicable under given conditions. An hours-of-service law limiting the actual duration of work to eight hours per day could undoubtedly be enforced if all expense to the roads and inconvenience to employees could be disregarded. But, taking conditions as they actually exist, it is believed that the complete elimination of overtime for train operatives is not a practical proposition, although further progress in this direction is possible.

Concerning the application of an eight-hour day to yard service, the commission expresses the opinion that recent experience has demonstrated that no great difficulties are to be encountered, especially in the important railroad yards of the larger centers. In some of the smaller yards and in certain kinds of switching service longer hours may be necessary.

The commission concludes that it is reasonable to assume that shorter hours for employees in train

operation would result in some increase in efficiency, but no evidence is at hand to indicate to what extent this would be true. The improvement would come in two ways: an increase in the efficiency of the individual and a gradual improvement in the personnel due to more desirable conditions of service. W. L. C.

MANY PLANT TROUBLES

Weather Conditions Unfavorable—Effects of Fuel Conservation Order

CHICAGO, Jan. 30—(*By Wire*).—Orders issued late last week relegated to second place deliveries of coal to all industries, preference being given to supplying homes and public utilities. The situation generally looked better last Saturday, but since then snow has been flying intermittently and deliveries to outlying towns, suburbs and the Chicago residential districts have been increasingly difficult, as much because of the snow-congested streets as because of any lack of coal.

The business shut-down was more complete Monday than on the first Monday holiday, especially in regard to offices, but it cannot be said that business men have altered their views much toward the fuel mandate. They believe other means might have been employed, also that there was no necessity of applying the order to the territory west of Ohio, although embargoes on freight shipments from that territory to the East might have been justified. The opinion is held that recovery will be quick so far as Chicago and vicinity are concerned as soon as the weather moderates. The operation of the order on steel mills was made less severe by the bad weather and the extent to which snow has reduced the delivery of coal, a fact which not only softens the judgment passed upon the Fuel Administration, but may be taken as an argument in its favor.

Seized by Fuel Administrator

Steel producers have had a hard week, the railroad switching service being bad, on top of which coal intended for steel making has been seized by the Fuel Administrators.

During the five-day shut-down many plants made needed repairs and used from 40 to 60 per cent of their men in clearing their yards and trackage of snow.

A number of local fabricating shops working for the Emergency Fleet Corporation or Submarine Boat Corporation have been exempted from the Monday closing order. It has been ruled that plants using hydroelectric power may operate, provided they do not use more heat than is necessary to prevent injury to property. Innumerable questions have been hurled at the State and county administrators throughout the week, and there has been a perfect maze of interpretations. The question of overtime to make up time lost was a persistent one. Many queries were sent to Washington on this point and P. B. Noyes of the Federal Fuel Administration finally said that any effort to run overtime to make up any part of the five days was a violation of the spirit of the order, but that if a manufacturer was accustomed to running overtime and continued to do so, there was no violation.

The Illinois Steel Co. is to-day operating four blast furnaces at South Works, six at Gary and one at Joliet and making and rolling steel for Government use only. The Inland Steel Co. operated at 60 per cent of capacity last week, and to-day it is working solely for the Government at a lower rate.

Conditions in New England

The coal situation in New England, particularly in Boston, Worcester, Providence, Newport, New Haven and Bridgeport, is, if anything, more critical than before the closing order was put into effect. Some of the plants which were closed during the five days were unable to start again on Wednesday because of coal shortage. One large plant thus affected was the Osgood Bradley Car Co., Worcester, which is engaged with a force of 700 men in making gun mounts for the Government. Plants in other towns were reported in similar condition.

Confusion in Cleveland

CLEVELAND, Jan. 30.—Considerable confusion has been caused among Cleveland machine-tool builders owing to a lack of uniformity regarding Government exemptions from the Monday closing order. This is perhaps largely due to the fact that the control of the fuel situation is in the hands of local and State representatives as well as the Fuel Administration in Washington. Some machine-tool builders who are building machinery both for the Government and for other companies having Government orders have secured exemptions from the Monday shut-down, but others have exemptions permitting them to work only on orders taken directly from the Government. In some cases these direct Government orders form such a small portion of the volume of business that the companies cannot afford to keep the parts of their plants that are working on these direct orders in operation on Monday. Efforts are being made to secure an extension of exemptions to include work on all machinery that is being built to do Government work. Some manufacturers, particularly those doing airplane work, have succeeded in securing Monday exemptions from the fuel order for machine-tool builders with whom they have orders for machinery.

Ban on Tin Speculation in England

Discussing the tin situation in England recently and the prohibition of further speculation there in that metal, the London *Ironmonger* of Dec. 29, 1917, says:

On Dec. 21 an order was issued by the Ministry of Munitions applying Regulation 30B of the Defense of the Realm Regulations to tin, which means that all speculative dealings in that metal have been stopped, as had already been done with almost all other staple metals in February, 1916. This decision, which had been expected for some time, was probably hastened by the recent sensational advance in the price to well over £300 a ton, and, as dealers in the metal had been warned in no uncertain manner that such a measure would be taken if the price of the metal was forced up in what was considered an unwarranted manner, it cannot be said that the dealers have any reasonable cause of complaint. London being the center of the tin trade, other markets could not help following its lead, and the only cause for surprise is that the order did not come sooner, since that the United States, the largest tin-consuming country, became one of our Allies in April of this year. In that month the price of tin was about £220 a ton, and it must be admitted that the American Government appreciated the difficulties of the tin position more quickly and clearly than our own authorities, and took immediate measures for the conservation of supplies and the proper distribution of available stocks. Still, the subsequent dilatoriness of the American Government in considering the proposals of its Tin Committee for dealing with the importation and distribution of the metal contributed materially to the advance in the value. The knowledge that America was short of supplies, together with the prospect of increased shortage, caused prices to advance in New York and stimulated speculation on this side. The one cause for regret is that it should have been necessary for our authorities to interfere with dealings in metal as they have done, and thereby weaken the influence of the London Metal Exchange to an unfortunate degree. It is to be feared that it will take many years for that institution to recover its position of pre-eminence among the metal exchanges of the world.

More Alloy Steel for British War Purposes

The managing director of the important British steel company, Vickers, Ltd., Sheffield, England, stated recently that the Government had intimated that it would be necessary to double the output of alloy steel for war purposes by February and that three times the present supply of such steel would be needed by June, this year.

The National Cast Iron Pipe Co., Birmingham, Ala., which recently increased its capital stock from $350,000 to $500,000 to provide for several extensions to its plant, has postponed its enlargement program on account of present unsatisfactory building conditions.

EXPORT LICENSES

Revision of Regulations Which Will Become Effective Feb. 1

WASHINGTON, Jan. 29.—A comprehensive revision of the regulations for the issuance of export shippers' licenses and for the filing of declarations has been prepared by a joint committee representing the War Trade Board, the Treasury Department and the Department of Commerce. The new regulations, which include the procedure for filing export declarations and licenses with collectors of customs, become effective on Feb. 1 and will supersede the requirements of the customs service and of the War Trade Board, which heretofore have been lacking in co-ordination.

During the period of the war and until further notice a new single sheet form of shippers' export declaration known as Customs Catalog No. 7525, must be filed with the collector of customs at the port of exportation for all goods exported on and after Feb. 1, 1918. The shipper will be required to prepare this declaration in quadruplicate for all exports to foreign countries and in duplicate for all shipments between the United States and its non-contiguous territory. For exports to a foreign destination, the shipper will present all four copies completely filled out and signed to the collector of customs, but will be required to make oath upon the original copy only. The oath may be taken before the collector of customs, a notary public or other person authorized to administer oaths.

Presented to Collector

The War Trade Board export license must be presented to the collector with the declarations covering the shipment, and the collector will compare the license with the four copies to see that they agree in all particulars. If all documents are in proper form, the collector will retain the original declaration and one copy and deliver two copies to the shipper. The shipper will deliver one copy to the steamship company and send the other copy with the goods to the customs inspector on the dock, without which merchandise will not be received. The inspector of customs will note upon his copy the facts of lading, short shipments, etc., and deliver it to the representative of the vessel, to be attached to the manifest of the vessel when presented at the custom house for clearance.

The copy, delivered by the shipper to the steamship company, must accompany the goods to their foreign destination, to be delivered to the American consular office at the port of discharge with copies of the manifest, and the master's oath and agreement made at time of clearance. If the consular officer has cause to believe that there has been any conduct contrary to the intent and purport of the manifest and affidavit, he will forward the copies thereof to the War Trade Board, Washington, with a full report, stating his grounds for such belief, otherwise he will retain the copies in his file. The manifest of the vessel must cover all goods on board and show for each shipment the custom house number of the export declaration. The oath and agreement of the master made at the time of clearance must be attached to the manifest.

Short Shipment Declaration

When the balance of a short shipment noted on the export declaration is ready to go forward, the shipper will prepare a new declaration marked "short shipment declaration," showing the number of the original declaration, which will take the same procedure as outlined above.

The affidavits required under the espionage and trading-with-the-enemy acts are necessary for all shipments to foreign countries, and the new form of export declaration with such affidavits thereon must be furnished in the manner prescribed above for all withdrawals from warehouse for exportation and other shipments under bond, except in transit. Export declarations will not be required on foreign merchandise shipped in transit through the United States from one foreign country to another. In the case of these "in transit" shipments, an additional copy of the carrier's manifest, Customs Catalog No. 7512, will be furnished by the shipper, with the export license number and date of expiration, if covered by license, noted thereon. This additional copy will be forwarded by the collector at the port of exportation to the War Trade Board, Washington.

One Copy of License

Only one copy of the export license will be issued by the War Trade Board, which will be sent to the applicant or his nominee and which must be presented to the collector of customs with the export declarations covering the shipment. When the shipment embraces all of the goods covered by the license, it will be retained by the collector of customs and forwarded to the War Trade Board, Washington, with the copy of the export declaration. In the case of short shipments, the export license will be retained by the collector until the balance has been exported or until the license has expired. When the shipper intends to export goods covered by one license in several partial shipments, he will give notice of such intent in the space provided on the back of the license. The export declarations for the first partial shipment being presented to the collector of customs, together with the license, he will compare them and, if they agree, countersign the notice of intent. The license will be returned to the shipper for use in subsequent shipments, in each of which the same procedure will be followed. When the final shipment has been made, the collector will retain the license and forward it, attached to the last declaration indorsed by him with the words "Final shipment," to the War Trade Board at Washington.

For partial shipments the same license may be used at each port of shipment. When, however, shipments are intended to be made simultaneously at different ports the shipper may request the collector of customs most convenient to him to issue a certificate for partial shipment to be used at another port. The collector of customs, after seeing that the amount of such shipment is noted upon the back of the license presented to him, will approve the application and forward it to the collector at the port where it is to be used. When the goods have been exported from the latter port, the collector of customs will indorse the fact of shipment, shortages, etc., if any, upon the back of the certificate and return it to the collector of issue.

When a license is not used, either in whole or part, the shipper will indorse upon the back of the license the reason for non-use and will return it to the War Trade Board, Washington.

Conditions Affecting Women Workers

At a meeting of the New Castle County section of the Delaware Women in Industry Committee, held in Wilmington, Del., Miss Clara Southwick, the executive secretary, told of inspections made at plants where women have replaced men in mechanical work. Attention was called to the necessity of women wearing bloomers or overalls and caps while working around machinery and in crowded quarters. It also was reported that the labor committee had defined "adequate heat" for workrooms where women are employed at not lower than 60 deg. Fahr. except under certain conditions, when an inspection and a special permit must be secured from the labor inspectors.

Mrs. T. Coleman DuPont, chairman of the Housing of Women in Industry Committee, reported having received a letter from the Bethlehem Steel Co., to the effect that the question of housing the girls employed at the New Castle plant of the company was under consideration.

The Connors Steel Co., Birmingham, Ala., recently incorporated with a capital of $300,000, will acquire and operate the Woodlawn Rolling Mill, heretofore operated by George W. Connors, president of the new organization. The company plans to manufacture bars, bands, steel shapes, steel hoops and also other products.

Machinery Markets and News of the Works

MORE WAR ORDERS PLACED

Shell and Fuse Work Predominate

Contracts Both in the East and Central West Result in Increased Demand for Tools

The Government continues to place contracts for munitions, from which considerable new buying of machine tools has developed.

In New York orders in varying sizes have been received during the past week from the E. W. Bliss Co., Brooklyn, N. Y., for fuse work; the Hyatt Roller Bearing Co., Newark, N. J., for making 1.7-in. smoke shells; the Thurlow Steel Co., Chester, Pa., for 4.7-in. shells; the Metropolitan Engineering Co., Brooklyn, N. Y., for work on 1,100,000 trench mortar shells; the Gorham Mfg. Co., Providence, R. I., which will make 3,000,000 hand grenades; the Neptune Meter Co., Long Island City, N. Y., for fuse work; the American Standard Metal Products Co., Paulsboro, N. J., for making detonators, and Slocum, Avram & Slocum, Inc., New York. The H. H. Franklin Mfg. Co., Syracuse, N. Y., has bought new equipment for work on crankshafts for Rolls-Royce aviation motors.

In Chicago there has been buying by the H. Mueller Mfg. Co., Decatur, Ill., which came into the market for 100 turret lathes for fuse work; the Winslow Brothers Co., Chicago, for 155-mm. shells, and the Moon Motor Car Co., St. Louis, also for 155-mm. shells. The Standard Steel Car Co., Hammond, Ind., has been buying large tools. The Air Nitrates Co., New York, has bought tools also for a machine shop in connection with the Government plant for atmospheric fixation of nitrogen at Muscle Shoals, Ala.

In the Philadelphia market the Navy Department has asked for bids on tools for machine shops at naval airplane stations on both sides of the Atlantic. The Pennsylvania Railroad Co. is again buying for the American railroad engineers in France.

Crane business continues fairly active in the East. The American International Shipbuilding Corporation, Philadelphia, has placed orders for 28 locomotive cranes. The Portland Co., Portland, Me., has bought a 15-ton traveling crane for a machine shop extension in which gun-forging lathes will be built for the Bethlehem Steel Co. The Groton Iron Works, Groton, Conn., is in the market for four 5-ton shop cranes for the shipyard of the Virginia Shipbuilding Corporation at Alexandria, Va.

New York

NEW YORK, Jan. 29.

Several new war contracts have been placed in the East, resulting in inquiries and some buying of machine tools, although not on a large scale.

The E. W. Bliss Co., Brooklyn, last week inquired for 25 bench lathes and other small tools for fuse work. The Hyatt Roller Bearing Co., Newark, N. J., bought a number of new tools for work on a contract for 1.7-lb. smoke shells. The Thurlow Steel Co., Chester, Pa., bought a few tools for work on 4.7-in. shells. The Metropolitan Engineering Co., 1250 Atlantic Avenue, Brooklyn, has taken a contract for 1,100,000 trench mortar shells. The Gorham Mfg. Co., Providence, R. I., is buying some new equipment for making 3,000,000 hand grenades. The Neptune Meter Co., Long Island City, placed orders for a number of new tools for work on fuse parts. The American Standard Metal Products Co., formerly the Standard Fuse Co., Paulsboro, N. J., will buy new equipment for work on a detonator contract. The company has an office at 25 Broad Street, New York. Slocum, Avram & Slocum, Inc., New York, placed orders for tools this week for work on war material.

The General Vehicle Co., Long Island City, N. Y., whose plant was taken over recently by the Government, has changed its name to the Aeronautical Engine Co. Little information is obtainable as to the plans of the Government for this plant, but it is the understanding in the machine-tool trade that it will be devoted to the manufacture of airplane engines. There is a possibility that considerable equipment will be inquired for soon. The H. H. Franklin Mfg. Co., Syracuse, N. Y., has taken a contract for 1500 crank shafts for Rolls-Royce aviation motors and has bought a small lot of new equipment. Other manufacturers working on parts of the same general contract are the F. B. Stearns Co., Cleveland, and the Taft-Pierce Mfg. Co., Woonsocket, R. I.

The Portland Co., Portland, Me., has purchased a 15-ton electric traveling crane for a machine shop extension to be used for making gun boring lathes for the Bethlehem Steel Co. The Portland company also has a shell contract.

The Cleveland Crane & Engineering Co. received a contract for two 50-ton traveling cranes from the Federal Shipbuilding Co. As reported last week, the remainder of the 11 cranes purchased were divided between the Milwaukee Electric Crane & Mfg. Co. and the Erie Steel Construction Co. The Toledo Bridge & Crane Co. and the Whiting Foundry Equipment Co. received orders for several cranes each from the Air Nitrates Co. The Groton Iron Works, Groton, Conn., will buy two or four 5-ton traveling cranes for the new shipbuilding plant of the Virginia Shipbuilding Corporation, Alexandria, Va. The J. G. White Engineering Corporation has purchased a 60-ton crane from the Toledo Bridge & Crane Co. The Thompson & Starrett Co., general contractor for the Government powder plant at Charleston, W. Va., has inquired for coal handling machinery and will probably be in the market for cranes and other equipment.

Bids recently submitted on traveling cranes show a reduction of about 10 per cent from prices prevailing a few months ago, this being a reflection of the lower costs at which builders are now able to obtain steel, many of the high-priced contracts having expired Jan. 1. Locomotive cranes sell at about triple the prices obtained three years ago.

The Wedge Joint Corporation, New York, has been incorporated with a capital of $100,000 to manufacture boilers, engines, etc. E. S. Merrill, T. F. Vandorn and J. A. Twichell, 316 West Seventy-ninth Street, are the incorporators.

The Sectionfold Partition Corporation, New York, has been incorporated with a capital of $50,000 by W. J. Miller, 60 Wall Street; R. Hanlon, 285 Classon Avenue, Brooklyn; and H. Brasch, 345 Hamilton Avenue, Queens; to manufacture metal partitions.

The Aetna Steel Products Co., 30 Church Street, New York, has increased its capital from $10,000 to $100,000.

The International Munitions Co., New York, has been incorporated in Delaware with a capital of $1,000,000 to manufacture guns, shells, etc. George V. Reilly, Samuel B. Howard and Arthur W. Britton, 65 Cedar Street, New York, are the incorporators.

The Technical Production Co., New York, has been incorporated with a capital of $25,000 to manufacture electrical supplies. G. H. Hyman, J. Lampel and H. Lampel, 580 Fifth Avenue, are the incorporators.

The Olympic Metal & Rubber Co., Brooklyn, has been incorporated with a capital of $40,000 to manufacture metal and rubber goods. S. Jaffe and I. Gerinsky, 194 Lee Avenue, Brooklyn, are the incorporators.

The Union Steel Products Co., New York, has been incorporated with a capital of $100,000 to manufacture steel spec-

ialties. R. Tally and I. and M. Gordon, 700 West 180th Street, are the incorporators.

The Central Smelting & Refining Works, 220 Rider Avenue, New York, has been incorporated with capital of $50,000. It is having plans prepared for a one and one-half story plant, 75 x 180 ft., at Borden Avenue and Third Street, Long Island City. N. Sacks, S. S. and J. J. Paymer are the incorporators.

The C. Mattison Machine Works, 480 Lexington Avenue, New York, manufacturer of lathes and shapers, has recently increased its capital from $25,000 to $225,000 for extensions to its machine shop and foundry. C. W. Mattison is president.

The Helicopter Co., New York, has been incorporated with a capital of $100,000 by S. S. Wheeler, P. C. Hewitt and F. B. Crocker, 44 West Forty-fifth Street, to manufacture airplanes.

Putnam & Co., New York, have been incorporated with a capital of $75,000 to manufacture ladders, hardware specialties, overhead tracking, etc. S. Putnam and M. Kornfeld, 32 Howard Street, and H. McInnes, 15 William Street, are the incorporators.

The R. S. Baldwin Co., New York, has been incorporated with a capital of $10,000 by E. G., E. A. and R. S. Baldwin, 39 Cortlandt Street, to manufacture machinery.

The Cary Springs Works, 240 West Twenty-ninth Street, New York, has leased for enlargement purposes property, 50 x 125 ft., adjoining its works.

The United States Fur Cutting Machine Corporation, New York, has been incorporated with a capital of $20,000 by E. Biro, W. and M. Blau, 154 Nassau Street.

Nathan A. Krischer, Inc., New York, has been incorporated with a capital of $50,000 to manufacture gas and electric supplies. Nathan A. Krischer, 30 West 112th Street; and J. Weinstock, 1459 Minford Place, are the incorporators.

The Automatic Railway Control Co., New York, has been incorporated with an active capital of $14,500 by L. H. Washburn, C. K. Allen and J. S. Wooster, 115 Broadway.

The Manhattan Can Co., Brooklyn, has been incorporated with an active capital of $100,000 by M. V. Moore, P. E. Page and J. Friedman, 708 Broadway, to manufacture cans.

The Higgins Machine Co., Brooklyn, has been incorporated with a capital of $50,000 by H. F. Herbertmann, E. H. Kelly and F. S. Kane, 43 Cedar Street, New York.

The Simmons Machine Co., Broadway, Albany, N. Y., is building a one-story addition, 120 x 120 ft., to cost $10,000.

The Albany Clay Products & Crucible Coal Co., Albany, N. Y., has increased its capital to $10,000.

The A. P. W. Paper Co., Broadway, Albany, N. Y., is considering the erection of a new plant to cost about $200,000 on property recently acquired in the lumber district.

The Hatch Motor Corporation, Rosebank, Staten Island, N. Y., is being reorganized under the name of the Ingram Motor Corporation. The company is negotiating for a suitable site at Perth Amboy, N. J., for the establishment of a plant for the manufacture of engines for automobiles, motorboats, etc., operated by kerosene, and of stationary engines. It is said that the capacity of the proposed works will be from 500 to 750 engines per day. Joseph Ingram is general manager.

The General Bakelite Co., Perth Amboy, N. J., manufacturer of insulation specialties, has secured property adjoining its works at Fayette and Rector streets from the Roessler & Hasslacher Chemical Co., of which it is a subsidiary. It is understood that the site will be used for expansion.

The Ulrich Co., 158 Ward Street, Paterson, manufacturer of shuttles, reeds, etc., has commenced the installation of machinery at its new plant at Allentown, Pa. It is also considering the erection of a four-story addition to increase its capacity.

The United States Government is negotiating for about 10,000 acres of the Hanover Farms tract, near Whiting, N. J., and is said to be planning to use the site for the construction of an ammunition plant, etc.

Cornelius A. Cole, Hackensack, N. J., and associates have incorporated in Delaware the Ferro Concrete Shipbuilding Co., with capital of $10,000,000 to manufacture vessels of various types. Arthur R. Oakley, Pearl River, N. Y., and Paul E. Britsch, New York, are other incorporators.

The Crocker-Wheeler Co., Ampere, N. J., manufacturer of electrical machinery, has filed plans for improvements and alterations to cost about $9,800.

The New Jersey Brass Foundry Co., Bayonne, N. J., has filed notice of organization to operate a plant at the foot of East Thirty-seventh Street. Edward M. Bolger, 387 Forest Street, heads the company.

The Union Iron Works, 567 Newark Street, Hoboken, maker of pile hammers, etc., is taking bids for a one-story addition, 50 x 150 ft., for a steel fabricating shop estimated to cost $12,000.

The International Engine Co., Jersey City, has been incorporated with a capital of $10,000 to manufacture engines and machinery. P. L. Nieses, W. A. Rogers and Joseph F. Curtin, 15 Exchange Place, are the incorporators.

The Goldschmidt Thermit Co., Cornelison Avenue, Jersey City, manufacturer of welding equipment, has acquired property at Bishop Street and Johnston Avenue adjoining its works. The company's plant site now includes a plot 200 x 600 ft.

The Standard Wire Co., 11 Passaic Avenue, Harrison, N. J., has been incorporated with a capital of $50,000 to manufacture wire and wire cloth. John W. Laffey, Paterson, is the principal incorporator.

Carl Schonert & Sons, 633 South Twentieth Street, Newark, manufacturers of tools, contemplate the erection of a one-story machine shop, 16 x 60 ft.

The Submarine Boat Corporation, Port Newark Terminal, Newark, has filed plans for a series of small buildings to cost about $21,000.

Burdick & Son, Albany, N. Y., manufacturers, have decided not to erect the four-story addition to its sheet-metal works on account of prohibitive prices for building materials and construction.

The American Bar Lock Co., Philadelphia, Pa., manufacturer of vault lights, skylights, etc., has leased property at 245-47 West Twenty-eighth Street, New York, for a branch assembling works. It now operates a plant on Borden Avenue, Long Island City, N. Y.

Buffalo

BUFFALO, Jan. 28.

The Atterbury Motor Car Co., Buffalo, manufacturer of motor trucks, is having plans prepared for a one-story addition to its plant at Elmwood and Hertel avenues and the Erie Railroad.

The Caldwell & Ward Brass Co., Syracuse, will rebuild its foundry on Decker Street recently damaged by fire to the extent of $10,000.

The Crescent Tool Co., Jamestown, N. Y., has purchased the Jamestown Cotton Mill property including a large brick factory at Center Street and the Erie Railroad. The Tool company operates a plant near by and has leased the additional property for four years to its former owners. Karl Peterson is president.

The New York Air Brake Co., 165 Broadway, New York, has conveyed to the Jefferson Munition Corporation, an affiliated organization, its plant and property at Watertown, N. Y., consisting of several buildings recently erected which will be used for the manufacture of ammunition. The company is negotiating for the purchase of adjoining property for expansion.

The Nobbytoy Co., Herkimer, N. Y., has removed its plant to Syracuse, where it will manufacture coasters, toys, etc. The company has recently been reorganized for increased operations. Oscar L. Wood is president and A. G. Ballester, vice-president.

The New Process Gear Corporation, Syracuse, is now using a section of its works for the manufacture of airplane parts.

Fire Jan. 16 destroyed a portion of the works of the Shinola Co., 12 Jay Street, Rochester, manufacturer of polishes, with loss estimated at about $50,000.

The Taylor-Shantz Co., 230 Mill Street, Rochester, manufacturer of tools, dies, etc., has increased its capital from $20,000 to $60,000.

The Aluminum Castings Co., Elmwood Avenue and the Erie Railroad, Buffalo, is building an addition to its coreroom.

The Sizer Forge Co., 238 Larkin Street, Buffalo, has had plans prepared for a number of new buildings estimated to cost $325,000, including a machine shop, covered yard and machine and forge shop in one group, to cost $112,000; a one-story brick forge shop, $45,000; a heat-treating plant, $87,000; and a three-story office building to cost about $80,000. The company is also said to be considering plans for additional structures to represent a total investment, including the foregoing, of $1,000,000.

The Meridan Electric Co., Buffalo, has been incorporated with a capital of $50,000 by J., A. F., and E. M. Keppel, Ebenezer, N. Y., to manufacture electrical goods.

The J. P. Devine Co., 1372 Clinton Street, Buffalo, manufacturer of vacuum drying equipment, will build a one-story brick and steel copper shop addition at its plant to cost $6,000.

The High Speed Hammer Co., 307 St. Paul Street, Rochester, is taking bids through its architect, Arthur J. Stickney, Cutler Building, Rochester, for a factory building, 53 x 101 ft., one and two stories, which it will erect on Norton Street.

The Shepard Electric Crane & Hoist Co., Montour Falls, N. Y., has completed plans for an addition to its plant.

The West Virginia Pulp & Paper Co., Mechanicsville, N. Y., John G. Luke, president, 200 Fifth Avenue, New York, will build a plant addition for which plans have been drawn by F. G. TenBroeck, 200 Fifth Avenue.

The Atlantic Stamping Co., 180 Ames Street, Rochester, has let contracts for a two-story building, 86 x 111 ft., for the manufacture of metalware and for an addition 66 x 98 ft. to its factory.

The Buffalo Aeroplane Corporation, Buffalo, has been incorporated by M. V. Moot, L. R. Gulick and S. Fay Carr, 302 Erie County Bank Building, with a capitalization of $100,000. Arrangements are being made for building and equipping a plant.

The Universal Aircraft Co., Norwich, N. Y., is having plans prepared for additions and alterations to its factory.

The Oldman Boiler Works, Buffalo, has let contracts for an addition to its shops on Illinois Street. The Ferguson Steel & Iron Co., Buffalo, has the contract for the structural steel work.

The United States Government has let contracts for two additional shops at the Watervliet Arsenal, Watervliet, N. Y., 200 x 600 ft. and 200 x 480 ft. respectively. Col. W. W. Gibson is in charge. Contract for rebuilding the dock and retaining wall at the arsenal has been let to the Great Lakes Dredging & Dock Co. for $100,000.

The Westinghouse Electric & Mfg. Co.'s service and repair plant, Buffalo, N. Y., located in a four-story and basement building at Lock Street and The Terrace, was completely destroyed by fire to-day with a loss of over $100,000 on supplies and appliances. A new location is being secured by the company.

New England

BOSTON, Jan. 28.

The machine tool business pursues the even tenor of its way, receiving a constant stream of orders for a machine or two but not obtaining orders in the big lots of a few months ago. Some fairly large inquiries are put out from time to time but orders from these are being placed very slowly.

The labor situation is reported by the Federal and State employment agencies to be in a well-balanced condition, but this statement is at variance with the claims of many small employers, particularly in regard to unskilled labor. Many small manufacturers have said this past week that they notice one very disagreeable outcome of the Garfield order in that they are losing both skilled and unskilled labor to the munitions and other exempted plants as the men desire to secure work where they can put in full time.

The Automatic Firearms, Ltd., Boston, has been incorporated with authorized capital stock of $500,000. Walter T. Hannigan is president and Leland Powers, 101 Milk Street, treasurer.

The International Leather & Belt Co., 511 Fifth Avenue, New York, has awarded a contract for a factory, 51 x 144 ft., one story, on Middletown Avenue, New Haven, Conn. It is reported that this is the first of three buildings to be built by the company.

The Liberty Mfg. Co., Brockton, Mass., has been incorporated with authorized capital stock of $100,000 to manufacture munitions and explosives. F. Walker Johnson, 735 Exchange Building, Boston, is president and treasurer.

The Chase Metal Works, Thomaston Avenue, Waterbury, Conn., is building a three-story addition, 20 x 60 ft.

The Marlin-Rockwell Corporation, New Haven, Conn., in the expansion of its Dixwell Avenue plant, now under way, will erect four buildings, 105 x 372 ft., one story; 36 x 165 ft., two stories; and two other structures of the same height but of smaller dimensions.

Philadelphia

PHILADELPHIA, Jan. 28.

Buying of machine tools in this market is for the most part in small lots. The Thurlow Steel Co., Chester, Pa., has taken a contract for 36,500 4.7-in. shells and has bought a few new tools. The Navy Department last week sent out a list of machine tools for naval airplane stations on both sides of the Atlantic. The purchasing department of the Pennsylvania Railroad Co. is again buying for the United States railroad engineers in France. Several large orders have been placed.

The American International Shipbuilding Corporation has placed an order with the Ohio Locomotive Crane Co. for 20 25-ton locomotive cranes and with the Industrial Works an order for eight 30-ton locomotive cranes.

The Hero Mfg. Co., Gaul and Adams streets, manufacturer of brass, bronze and aluminum products, is having plans prepared for a three-story plant to cost $30,000.

The Philadelphia & Reading Railroad Co., Philadelphia, has broken ground for its proposed machine shop and engine house at its repair works at American Street and Erie Avenue. The machine shop will be one-story, brick, 130 x 215 ft., to cost $100,000; the engine house will be one-story, of brick and concrete, 109 x 334 ft., and will cost $200,000.

Fire Jan. 18 destroyed part of the sheet metal-working plant of John M. Melloy's Sons, 1419 Spring Garden Street, Philadelphia, with loss estimated at $50,000.

Contract for erecting the wood-working plant for George W. Smith & Co., Powelton Avenue, Philadelphia, at Forty-ninth and Botanic avenues, consisting of one-story structures 80 x 480 ft., 80 x 440 ft., 80 x 275 ft. and 80 x 104 ft., has been awarded. The cost will be about $150,000.

Fire Jan. 24 originating at the plant of the George Myers Machine Co., Second and Erie streets, Camden, N. J., destroyed a number of manufacturing plants in the vicinity with a loss estimated at $500,000. The plants affected by the fire, including total and partial losses, were: The George Myers Machine Co., specializing in the production of gaskets for airplanes; the William Grovers Machine Co.; the Montross Metal Roofing Co., manufacturer of metal shingles, etc.; the Van Austin Pattern Casting Co., operating a foundry; D. A. Wedmore & Co., manufacturers of special radiators for Ford automobiles; the Fox Paint Elbow Galvanizing Co. The fire was checked at the plant of the Lindholm Metal Stamping Co., manufacturer of stamped metal products, which was damaged considerably by water.

The Automobile Appliances Co., Camden, N. J., has been incorporated with a capital of $10,000 by George D. and J. Howard Van Sciver, Philadelphia; and Harry J. Stockum, Marlton, N. J.

The Precision Machine & Tool Co., Allentown, Pa., has been incorporated with a capital of $10,000 by J. J. Melly and others.

W. L. Brubaker & Brothers, Millersburg, Pa., manufacturers of machine tools, are having plans prepared for a one-story machine shop, 75 x 100 ft.

The Merchant Shipbuilding Corporation, Bristol, Pa., has received a contract from the Emergency Fleet Corporation for 26 additional steel vessels.

The Mifflinburg Buggy Co., Mifflinburg, Pa., has filed notice of change of name to the Mifflinburg Body Co. It proposes to discontinue the manufacture of horse-drawn vehicles and devote its plant to the manufacture of automobile bodies. A three-story addition, 60 x 208 ft., is now in course of construction at a cost of $60,000.

The Helios Mfg. Co., Scranton, Pa., has awarded a contract for the construction of a one-story steel and concrete plant, 100 x 100 ft.

A. C. Morrow and J. K. Shoenfelt, Duncansville, Pa., have organized a company with capital of $30,000 to establish a canning factory, including a plant for the manufacture of cans for its own use.

The Valley Forging Co., Railroad Avenue, Verona, Pa., manufacturer of iron and steel forgings, has commenced the erection of a one-story forge shop, 75 x 250 ft., to cost $48,000.

The plant and equipment of the Pullman Automatic Ventilator Mfg. Co., at York, Pa., has been sold by the York Trust Co., receiver, to Herbert B. Mehring and John F. Rudisill, manufacturers of mill supplies, 293 North George Street, York, for $15,000. They also operate a plant in Connecticut for the manufacture of copper bands and special shapes of copper and sheet brass. This plant will be removed to the newly acquired works at York. Carl L. Lutten, manager of the Pullman company, will remain as its president.

Baltimore

BALTIMORE, Jan. 28.

The National Enameling & Stamping Co., 1901 Light Street, will erect a one-story building, 32 x 71 ft., at Race and Ostend streets to cost $7,000.

The Consolidated Power Co., Baltimore, has been granted a permit for a two-story power plant, 60 x 90 ft., at 25 Custom House Avenue at a cost of $65,000.

The National Coal-Saving Corporation, 1115 American

Building, Baltimore, has been incorporated with $1,000,000 capital stock to manufacture fuel-saving appliances. The incorporators are John B. Leonard, Allen R. Foote and Clarence K. Bowie.

The International Metal Co., 642 West Pratt Street, Baltimore, has been incorporated with $75,000 capital stock to manufacture projectiles, etc. The incorporators are Monte London, Abraham M. Davis and Elias Rex Jacobs.

Announcement has been made that the co-partnership of the Kemp Machinery Co., 223 North Calvert Street, Baltimore, Md., consisting of J. P. and S. V. Kemp has been dissolved. J. P. Kemp has purchased the interest of S. V. Kemp and will continue the business under the old name.

Julian P. Friez & Sons, Central Avenue and Baltimore Street, Baltimore, manufacturers of meteorological instruments, have awarded contract for a four-story addition, 39 x 47 ft., to cost $30,000.

The Autogenous Welding & Equipment Co., 1217 Maryland Avenue, Baltimore, will build a two-story machine shop addition, 35 x 95 ft., to cost $10,000.

Fire Jan. 21 destroyed a portion of the shipyards of the H. E. Crook Co., Inc., Locust Point, near Baltimore, with loss estimated at $50,000.

The Standard Electric & Elevator Co., manufacturer of electrical equipment, East Paca Street, Baltimore, is reported planning to increase its capital by $100,000.

A one-story machine shop, 80 x 100 ft., to cost $50,000, will be erected by the United States Industrial Chemical Co., Baltimore, at its works at Curtis Bay. It is also said to be planning for a new one-story copper shop to cost $50,000.

Fire Jan. 25 destroyed a large portion of the shipbuilding plant of the J. Henry Smith & Sons Co., Curtis Bay, near Baltimore, with loss estimated at $500,000. The company has contracts for eight 3500-ton vessels.

The Bartlett-Hayward Co., Baltimore, Md., is reported to be planning for a group of buildings to provide increased capacity. The company has recently commenced the construction of a number of extensions. Parker, Thomas & Rice, Baltimore, are architects for the company.

The E. I. duPont deNemours Co., Wilmington, Del., has commenced the erection of a new shell-loading plant near Williamsburg, Va. Following the completion of the present unit, it is said that others will be constructed, at a total reported estimated cost of over $5,000,000.

The Bureau of Yards and Docks, Navy Department, Washington, is taking bids for a one-story boiler-working shop at the local navy yard.

The Gas Engine & Electric Co., Charleston, S. C., has been incorporated with a capital of $50,000 by A. D. Wall, H. S. White and J. E. Bonneau.

The Oil Well Supply Co., Parkersburg, W. Va., has commenced the erection of a one-story plant, 50 x 140 ft., to cost about $25,000.

The R. C. Meadows Mill Co., Pores Knob, N. C., recently incorporated with a capital of $100,000, has acquired the plant of R. C. Meadows, specializing in the manufacture of feed mills, iron frames, etc. The new company is planning to increase the capacity of the works next summer. R. C. Meadows is secretary.

A new one-story foundry, 45 x 150 ft., will be erected on Decatur Street, Richmond, Va., by the Cameron Store Co., Decatur and Twenty-first streets, at an estimated cost of $8,000.

The Diamond Match Co. is reported considering the erection of a new plant at Fort Wentworth City, near Savannah, Ga.

The Thompson-Weinman Co., Cartersville, Ga., has been incorporated with a capital of $600,000 to operate an iron works. W. J. Weinman, Cartersville; S. W. Thompson, Jamestown, N. Y.; and S. M. Evans, Essex Fells, N. J., are the incorporators.

Chicago

CHICAGO, Jan. 26.

The actual placing of munitions orders is less marked than it was two or three weeks ago, but a few additional contracts for shells and fuse parts have been placed and the necessary machine tools are being sought. The domestic demand for small miscellaneous machines such as are usually sold from wareroom floors has been fairly good. To the scarcity of large machines is added the difficulty of making deliveries, whether shipments are made from the factory or the dealer. Railroad embargoes prevent movement to the East, and from Ohio points to Chicago or nearby points. About the only direction in which shipments can be easily and freely made from Chicago is to the West. The difficulty of shipping eastward is illustrated by the case of a dealer who has sold a large machine to a company in Buffalo, N. Y., operating on a French munitions contract, but all efforts to get the machine off have proved futile.

That the Government is keeping a much closer eye on machine-tool shipments would seem to be evidenced by the fact that it recently ordered the diversion of some lathes in transit to a dealer, from the dealer to whom they were consigned to the Twin City Forge & Iron Co., Minneapolis, Minn.

The H. Mueller Mfg. Co., Decatur, Ill., manufacturer of brass goods, has taken an order for fuse parts, and has been in the market for 100 turret lathes on which it wants quick delivery. It placed 50 machines with one maker, but another tool builder was obliged to decline the business or any considerable part of it because it could not supply the machines in the time specified.

The Winslow Brothers Co., Chicago, whose regular line is ornamental iron and bronze work, has taken a contract for 155-mm. shells. It has been actively purchasing equipment and expects to begin the production of shells March 1. The company has engaged an expert formerly with a Canadian munitions plant who will organize the shop and working force.

The Moon Motor Car Co., St. Louis, Mo., has been making tentative inquiry for machines necessary in the manufacture of 155-mm. shells preparatory to taking an order. It is understood that the company has not actually closed a shell contract.

The Rock Island Arsenal has concluded buying for the present, but the Standard Steel Car Co., Hammond, Ind., continues to place orders for large machines.

Some machine-shop equipment has been bought in this market by the Air Nitrates Corporation, New York, which is building a large chemical plant in Alabama for the extraction of nitrates from the air.

Reorganization of the Smith Motor Truck Corporation, Chicago, formerly the Smith Form-A-Truck Co., without recourse to court action, has been announced by David R. Forgan, president National City Bank of Chicago. The company will continue business in charge of the creditors' committee, of which Mr. Forgan is chairman.

The Independent Button & Machine Co., 3940 Ravenswood Avenue, Chicago, whose four-story factory was recently destroyed by fire, with a loss of $250,000, is planning to rebuild. Arthur L. Moore is president.

A one-story and basement power house, 50 x 125 ft., will be built for the Monterey Electric Light & Power Co., Monterey, Ind. The plans are being prepared by Carl Nielsen, 154 West Randolph Street, Chicago.

Building operations in and near Chicago are at low ebb, and worth while items bearing on new industrial buildings or expansions of old ones are difficult to find.

The Stutesman Farm Tractor Co., Chicago, a Delaware corporation, has increased its capital from $100,000 to $200,000.

The Presto Passenger Truck Co., Chicago, has been incorporated in Delaware with a capital of $400,000 to manufacture automobiles. G. H. Gibney, M. H. Lalor and W. E. Fitzgerald, Chicago, are the incorporators.

The Chicago Bearing Metal Co., 2234 West Forty-third Street, Chicago, is building a one-story plant, 100 x 225 ft., at 2216 West Forty-third Street, to cost $15,000.

The American Steel Products Co., Macomb, Ill., has increased its capital from $60,000 to $100,000.

The Orben Stove Co., Belleville, Ill., has been incorporated in Delaware with a capital of $50,000 to operate a foundry for the manufacture of stoves and other products. Henry A. Lengfelder, George C. and Jacob Mueller are the incorporators.

The Bettendorf Foundry Co., Rock Island, Ill., is planning to rebuild its foundry recently damaged by fire.

The Railway Mine & Supply Co., 332 South Michigan Avenue, Chicago, has broken ground for a new plant at Kincaid, Ill., to cost $75,000. It will consist of a one-story foundry, 60 x 375 ft.; a one-story blacksmith shop, 60 x 100 ft., and a one-story assembling works.

The North Western Stamping Co., Burlington, Iowa, is considering the construction of a one-story plant, 100 x 300 ft.

The Winslow Mfg. Co., Kansas City, Mo., manufacturer of tractors, has awarded a contract for a one-story plant, 50 x 120 ft., to cost $40,000.

Chanute, Kan., has awarded contracts for improvements in its power plant to cost $25,000. C. G. Wood is city clerk.

The foundry of the Logansport Casting Co., Logansport, Ind., was destroyed by fire Jan. 8 with a loss of $60,000. The

company is affiliated with the Western Motor Works. A. W. Pattau is manager.

Milwaukee

MILWAUKEE, Jan. 28.

The machine tool demand continues at a high level due to the urgency of Government requirements. Milling machine manufacturers are increasing their capacities from 25 to 50 per cent, but the pressure of orders is so great that practically nothing is gained on shipments. A very large part of the immediate demand is on Government account and little business is being offered by so-called private machine shops, due largely to difficulty in obtaining deliveries. More activity in industries other than those affiliated with Government business is shown, especially in the manufacture of farm machinery, implements and motor trucks. An extraordinary demand for motor trucks and trailers has arisen from the necessity of overcoming the demoralization of railroad traffic.

The Universal Shipbuilding Co., Sturgeon Bay, Wis., organized recently to take over the plant, yards and business of Rieboldt, Wolter & Co., Sturgeon Bay, has elected the following officers: President, Philip Binzel, Oconomowoc, Wis.; vice-president and general manager, Gustav A. Huck, Sturgeon Bay; second vice-president, Hubert Riesen, Milwaukee; secretary, Louis Liebscher, Jr., Milwaukee; treasurer, Herbert L. Peterson, Sturgeon Bay. The directors are Walter E. Pommer, Theodore Froemming, Max Grefig, Ignatz Wetzel, all of Milwaukee. The company, however, will not become active operator of the property until May 1 or 15, at which time Rieboldt, Wolter & Co. expect to have completed work on a Government transport.

The Racine Engine & Machinery Co., Racine, Wis., which has been specializing in the manufacture of machinery and appliances for confectionery makers, has changed its corporate style to the Racine Confectioners' Machinery Co. The production of engines has been entirely discontinued. The officers are: President, Frank E. Naylor; vice-president, E. E. Cahoon; secretary and treasurer, Charles C. Naylor.

The McKenzie Mfg. Co., LaCrosse, Wis., has been incorporated with a capital stock of $25,000 to succeed to the foundry and machine shop business conducted under the same name. It specializes in the manufacture of farm implements and machinery, but also does a jobbing business in castings and machine work. The incorporators are Ralph E. McKenzie, Charles E. and Virginia Bentley.

The Green Bay Barker Co., Green Bay, Wis., manufacturer of special machinery for removing bark from logs and other wood-working equipment, has awarded a contract to Victor DeRenne, 1211 Day Street, Green Bay, for a one-story concrete and brick machine-shop addition, 60 x 100 ft.

Suelflohn & Seefeld, 45-53 Second Street, Milwaukee, wholesalers and jobbers in iron and steel, hardware and automobile supplies, have incorporated under the style of the Suelflohn & Seefeld Co. with a capital stock of $300,000. Their incorporators are Gustave A., Henry F. and Clarence A. Seefeld, who have been the principal partners under the old organization.

Hartford, Wis., is contemplating the purchase of a new 500-hp. water tube boiler to supplement three boilers of a combined capacity of 450 hp. in the municipal electric light and power plant. An addition to the present boiler house is to be erected. The project probably will not mature before midsummer.

Fernekes & Cramer, architects, 1304 Pabst Building, Milwaukee, are preparing plans for a four-story factory building, 50 x 100 ft., of reinforced concrete and brick construction, upon which estimates will be taken before the owners, as yet unnamed, will make a decision on proceeding with the project.

N. B. Gaston & Sons Co., Beloit, Wis., manufacturer of scales and weighing apparatus, is erecting several shop additions which will increase the capacity of all departments from 35 to 40 per cent. Considerable new equipment will be installed in the foundry, machine shop, forge shop, smithy, japanning, painting and drying shops.

The Otto Biefeld Co., Watertown, Wis., manufacturer of boilers, engines, machinery and fabricator of structural material, has broken ground for additions to its foundry, machine shop and erecting shop, which will cost about $35,000 with equipment. The additions will be ready about April 15 or May 1 and increase the capacity more than 50 per cent. The company is doing its own construction work.

The Board of Industrial Education, Appleton, Wis., has decided to erect a new vocational training institute, costing $80,000, some time in 1918. An architect will be selected soon. C. D. Thompson is secretary.

The Townsend Mfg. Co., Janesville, Wis., manufacturer of farm engines and tractors, has plans for a one-story machine-shop addition, 65 x 110 ft., costing about $15,000. R. B. Townsend is general manager. W. H. Blair, architect, will take bids early in February.

The Arneson Foundry Co., Kenosha, Wis., has broken ground for a one-story concrete and brick foundry addition, 72 x 125 ft., designed by White, White & White, architects, Kenosha. The improvement will cost $40,000 to complete.

The Reliance Motor Truck Co., Appleton, Wis., is receiving sealed bils until 10 a. m., Feb. 1, for the construction of the first unit of its new factory, 75 x 300 ft., one-story, of reinforced concrete and brick, with sawtooth roof. T. M. Purtell, 821 College Avenue is secretary.

At the annual meeting of the stockholders of the La Crosse Tractor Company, held at La Crosse, Wis., Jan. 26, it was decided to increase the capital stock to $2,500,000 to provide for the rapid growth of its business.

Detroit

DETROIT, Jan. 28.

The coal situation in Michigan is most serious. More than 40 plants in Detroit and hundreds throughout the State have closed down, while most of the others have not enough coal to last them for more than a week or ten days. The Fuel Administration's closing orders failed to remedy the situation in this district, and the coal coming in is only a small proportion of the amount consumed daily. Unless the situation improves, practically all manufacturing plants in the State including those working on Government orders and munitions, will be forced to close within a comparatively short time. The coal situation has upset business and resulted in a decrease in the number of machine tools purchased. Local dealers declare that manufacturers are holding off until conditions become more settled and there is a probability that they will be able to continue manufacturing. Deliveries have not yet improved, from three to five months being the usual delay on high-grade machines. The second-hand market is slow, most of the orders being for new high-grade machines for munition making. Business in this section generally has suffered from the confusion caused by the closing orders of the Fuel Administrator.

Extensive use of motor trucks to haul coal from Toledo, and perhaps directly from tne mine, is being planned by the Detroit Board of Commerce to prevent a coal shortage in Detroit next year. Motor trucks will probably be used also to relieve the railroads of all short-haul freight.

The Lavigne Mfg. Co., Detroit, has changed its name to the Commonwealth Brass Corporation. P. D. Dwight is president and N. A. Henwood vice-president and general manager.

The Detroit Ship Building Co., Detroit, will erect an eight-story brick and frame factory building at the foot of Orleans Street, Detroit.

The Detroit Carrier & Mfg. Co., Detroit, has been incorporated for $1,000,000.

The Flottrop Mfg. Co., Chicago and Grand Rapids, has been incorporated for $50,000 and is increasing the number its employees from 50 to 500.

The Precision Casting Co., Syracuse, N. Y., and Pontiac, Mich., has been incorporated for $300,000.

The United Smelting & Aluminum Co., Detroit, Mich., has removed its offices from 1334 Dime Bank Building to 74-78 Fort Street, East, where it has also opened a warehouse with a complete stock of aluminum ingots, alloys, sheets, circles, plates, also Babbitt metal, solders, and non-ferrous pig metals for its trade in the Middle West. E. S. Christiansen is Detroit manager.

The recent reorganization of the Michigan Drop Forge Co. by which the new Delaware corporation replaced the old company of the same name, was followed a short time ago by an increase in capital stock to take care of contemplated improvements in equipment and property. The reorganization brought into the company several well-known manufacturers and business men of Detroit and Michigan. B. F. Esgar, president and general manager, has been in active charge of the company for the past three and one-half years. Hugh O'Conner of the Michigan Wire Cloth Co., Detroit, is vice-president, and Paul A. Leidy is secretary and treasurer. Other directors include H. M. Jewett of the Paige-Detroit Motor Car Co.; J. B. Breymann, capitalist of Toledo; J. H. French of the Michigan Stamping Co., Detroit; R. T. Herdegen of the Dominion Forge & Stamping Co., Walkerville, Ont.; J. W. Kay and J. V. Roemer of Kay & Co.; J. G. Hamblen, Jr., and John O'Conner, attorneys, Detroit; O. W. Mott of Mott Wheel Works, Jackson, Mich.; and William Sparks of the Sparks-Withington Co., Jackson.

The Potato Implement Co., Traverse City, Mich., contemplates the doubling of its plant capacity, provided it gets

suitable side-track facilities, otherwise it will be obliged to change its location. J. L. Novak is secretary.

The Perlman Rim Corporation, Jackson, Mich., one of whose plants was destroyed Jan. 7 with a loss of $100,000, is taking care of its production by running double shifts in its other two plants. The loss to the building was $60,000, to the machinery $30,000, to stock $10,000. Officers of the company are Clarence M. Day, president; Charles M. McFarland, vice-president; and L. F. Bomhoff, secretary and treasurer.

Cleveland

CLEVELAND, Jan. 28.

The demand for small lots of machine tools continues fairly active, but no round lot orders or inquiries have developed for several weeks, due doubtless to the fact that no large Government orders have been placed in this vicinity for some time New orders coming in are almost entirely for Government work. One new inquiry is for about 75 turret lathes from the H. Mueller Mfg. Co., Decatur, Ill. Early delivery is wanted on these for Government work.

Power plant equipment is very scarce for early delivery, and in order to secure a power plant for its new ordnance works the Morgan Engineering Co., Alliance, Ohio, is looking for a municipal or other plant of 2000 or 3000 hp. capacity that it can buy and move to Alliance.

The Port Arthur Shipbuilding Co., Rockefeller Building, Cleveland, through its purchasing department is inquiring for a plate planer with a 30-ft. bed and a capacity for 1½ in. plates.

The Breman & McBride Co., 6715 Carnegie Avenue, Cleveland, has awarded a contract for a one-story addition, 58 x 90 ft., to its machine shop.

The Sterling Spring Co., 2148 Scranton Avenue, Cleveland, will shortly rebuild its plant, recently damaged by fire.

The Welding Equipment & Supply Co., Cleveland, has been incorporated with a capital stock of $10,000 by R. J. Bishop, W. H. Martin and others.

The Buckeye Brass & Foundry Co., Cleveland, will erect a machine shop and foundry, 60 x 100 ft. Allen Sogg, architect, American Trust Building, will soon take bids.

The Bridgewater Machine Co., Akron, Ohio, has placed a contract with the Carmichael Construction Co., Akron, for a foundry addition.

The plant of the Ohio Wire Goods Mfg. Co., Akron, Ohio, was destroyed by fire Jan. 15.

The Canton Chaplet Mfg. Co., Canton, has been incorporated with a capital stock of $10,000 by A. R. Turnbull and others, and will manufacture gasoline and oil gages for automobiles, foundry chaplets and various specialties. This company has been in business for a few months as a partnership and has now absorbed the Imperial Fluid Gage Co. A. R. Turnbull is president, H. E. Case, vice-president, and G. F. Shaeffer, secretary and treasurer.

The Hercules Motor Mfg. Co., Canton, Ohio, has taken an order from the Ford Motor Co., Detroit, for manufacturing 65,000 motors for farm tractors. These are to be turned out at the rate of about 100 motors per day. It is stated that they will be shipped to Cork, Ireland, where the Ford Co. has an assembling plant and will be used in tractors built for the Allies.

The plant of the Miller Pasteurizing Machine Co., Canton, Ohio, was practically destroyed by fire a few days ago, with a loss estimated at $200,000.

The Humphrey Bronze & Aluminum Co., Bellefontaine, Ohio, has been formed by Charles Humphrey and others, and will establish a plant to manufacture brass and aluminum castings.

The American Brake Shoe & Foundry Co. has commenced the manufacture of 150 millimeter shells in its Erie, Pa., plant, and it is stated will soon start work on an order for 3000 field pieces of light artillery. The large extensions to its works are nearly completed.

The Conneaut Metal Works Co., Conneaut, Ohio, is planning an increase in its capital stock from $40,000 to $100,000, with a view of increasing the capacity of its plant.

The Alten Foundry & Machine Works, Lancaster, Ohio, will receive bids shortly for a two-story extension, 41 x 104 ft.

The machine shop, electrical department, tool room and other departments of the H. Koppers Co., Lorain, Ohio, where it is erecting coke ovens for the National Tube Co., were destroyed a few days ago by fire.

The Minster Machine Co., Minster, Ohio, is having plans prepared for an addition to its plant.

The Alliance Controller Co., Alliance, Ohio, has been organized with a capital stock of $10,000 by S. D. Lane, J. D. Brown and others.

The Hetherington Co., Piqua, Ohio, manufacturer of emery wheel dressers, has been incorporated with a capital stock of $25,000. S. W. Hetherington is manager.

The W. W. Sly Mfg. Co., Cleveland, manufacturer of foundry equipment, is revising its engineering department catalog files, and wishes to receive latest catalogs. R. H. Moore is chief engineer.

Indianapolis

INDIANAPOLIS, Jan. 28.

The Noble Motor Truck Corporation, Kendallville, Ind., has been incorporated with $1,000,000 capital to manufacture motor vehicles. The directors are C. J. Munton, John Hauff, George D. McLeod, G. M. Patterson, H. L. Postle, A. M. Jacobs and W. G. Roberts. State Senator C. J. Munton is president; G. M. Patterson, secretary, and H. W. Bradtmiller, treasurer.

John F. Boesinger, Indianapolis, has been appointed by the Federal Court receiver of the Indiana assets of the Shadburne Combined Motors Co., also known as the Shadburne Brothers Co., Chicago. The Chicago receiver was the petitioner, alleging that the company has property and equipment at Franklin, Ind., of the value of $130,000.

The Reliance Mfg. Co., Michigan City, Ind., has increased its capital stock from $1,500,000 to $2,000,000.

The Union City Body Works, Union City, Ind., has been taken over by the Wright Aeroplane Co., Dayton, and will be used to manufacture aeroplane parts.

The American Tin Plate Co.'s plant at Elwood, Ind., has resumed operations after a shutdown of two weeks because of a shortage of steel. The plant employs about 1800 men.

The Emerson-Brantingham Co., Columbus, Ind., has received an order from the Marine Equipment Co., Detroit, for 400 marine hoisting engines. The contract price is $280,000.

The Apex Co., Evansville, Ind., has been incorporated with $16,500 capital to manufacture hydro-carbon engine parts. The directors are Harry W. Aschinger, Walter W. Carson and Frank McKinney.

Fire Jan. 23 destroyed the plant of the Stewart Carey Glass Co., Indianapolis, with loss estimated at $100,000.

Cincinnati

CINCINNATI, Jan. 28.

Several more manufacturing firms have obtained permismission to operate Monday on Government work, but very few shops are employing more than 75 per cent of the usual force on this day. The matter of separating outside work from Government jobs has been systematized in most shops so that it does not give quite as much trouble as anticipated. The coal supply is so limited that many plants are hard put to keep operating and frequently last week some of them had only a few hours' supply ahead. At Hamilton, Ohio, the Hamilton Machine Tool Co. had orders from the Government to continue operating during the five days holiday, but this concern was not able to get sufficient coal to even heat its plant to a high enough temperature for its workmen.

Nearly all plants have machine tools boxed and ready for shipment but are unable to forward them, although these machines are for Government work, either directly or indirectly. The portable electric tool makers have all the business they can handle; only two have been exempted from closing on Monday. Manufacturers as a rule are employing part of their help in cleaning up around their plants and making minor repairs, so that the day is not entirely lost. The jobbing foundries are still having trouble getting coke and pig iron delivered, and two or three will probably remain closed the remainder of the week.

The Fulflo Pump Co., Cincinnati, whose plans for removing its factory to Blanchester, Ohio, have recently been mentioned, has established a sales office in the Mercantile Library Building that will be in charge of A. N. Martin, general sales manager. The executive office of the company remains at 123 Opera Place, but it will be removed to Blanchester as soon as the new plant there is completed.

L. B. Patterson, president and treasurer, J. G. Hey, vice-president and general manager of the Cincinnati Pulley Machinery Co., have purchased, with William Davis and B. F. Netz, New Castle, Ind., the Newcastle Foundry Company's plant, which will be operated under the name of the Davis Foundry Co. Mr. Davis and Mr. Netz have been for many years connected with the Newcastle foundry. The officers of the new company are as folllows: President, J. G. Hey; vice-president and general manager, William Davis; secretary and treasurer, L. B. Patterson; assistant general manager, B. F. Netz.

The Morris Machine Tool Company, Cincinnati, is adding equipment to its plant that will enable it to greatly increase its present output of lathes. Arthur G. Pletz is general manager.

On Jan. 23 fire destroyed three out of five buildings of the Hess Spring & Axle Co. plant at Carthage, a Cincinnati suburb. The loss is estimated at $100,000. Rebuilding plans have not yet been announced.

The Cincinnati Shaper Co., Cincinnati, is having plans prepared for a one-story brick addition, 85 x 90 ft., to its plant in Camp Washington. P. G. March is president.

The Charles Boldt Co., Cincinnati, has recently received a Government order for containers for shells that will require 1000 tons of cardboard to make. No plant additions will be required to handle the work.

R. A. Jones & Co., Covington, Ky., makers of soap presses, have let contract for a plant addition, 60 x 90 ft., one story, of brick construction.

The Liberty Machine Tool Co., Hamilton, Ohio, recently organized, has let contract to the Frank Vaughn Building Co. for the construction of a plant in Lindenwald estimated to cost $28,000.

The Montgomery Tool & Mfg. Co., Dayton, has been incorporated with $50,000 capital stock by Charles A. Thistlewaite, Henry J. Malloy and others. Nothing is known as to its manufacturing plans.

The American Chain Co., Columbus, whose plant was almost totally destroyed by fire two weeks ago, has decided to rebuild. Four brick and stone buildings will be erected. The new plant will have nearly double the floor space of the former.

The Central South

LOUISVILLE, Jan. 28.

Foundries and machine shops were little affected by the five-day suspension order, the majority operating on exempted lines, and implement factories resumed as soon as the revised order was issued. Most of these plants are working at capacity and are declining orders. A few days of moderate weather eased up local traffic and working conditions and started oil well and coal mine development work again, with renewed demand for supplies.

The Rural Light & Power Co., Louisville, has been incorporated with capital stock of $6,000 by W. R. Katterjohn, R. M. and A. H. Thompson. It will build, install and purchase light and power plants in small towns.

The Roy C. Whayne Supply Co., Louisville, is in the market for single and double drum electric hoists either for three-phase, 60-cycle, alternating current, or for 220 to 250 volt direct current; also for two and three-drum hoists, 7 x 10-in. and larger.

The Anglo-American Mill Co., Owensboro, Ky., manufacturer of flour mills, has increased its capital from $650,000 to $1,000,000 and will increase the capacity of its plant. L. Freeman Little is president and A. S. Johnson general manager.

The Rolling Fork Oil & Gas Co., 1470 First Street, Louisville, is asking for prices on drilling and pumping outfits, oil well casings, etc.

The Artisans Oil & Gas Co., Woolsack Building, Newport, Ky., will open bids on March 1 on pumping machinery to operate three and a half miles of 3-in. oil pipe lines.

The Lenoir Car Works, Lenoir City, Tenn., will rebuild its blacksmith and machine shops recently destroyed by fire.

The John G. Duncan Co., Knoxville, Tenn., is asking for dealers' prices on a used Defiance spoke lathe.

The Bridgeport Woodenware Mfg. Co., Bridgeport, Ala., has been incorporated with a capital of $10,000. G. W. Doren, James R. Davidson and C. H. Duffy are the incorporators.

Fire Jan. 12 destroyed the blowing engine plant at the works of the Woodward Iron Co., Woodward, Ala., with loss of about $75,000. It will be rebuilt.

The Southern Machine Co., Chattanooga, Tenn., has been organized with a capital of $200,000 to specialize in the production of shrapnel shells. It is planning for the erection of a plant with initial capacity of about 2000 shells per day. Herbert M. Lofton and W. A. Sadd head the company.

St. Louis

ST. LOUIS, Jan. 28.

The Gregory Drainage District of Missouri, Gregory Landing, Mo., is having plans prepared by E. T. Perkins, State Bank Building, Quincy, Ill., for a $75,000 pumping station.

A hydroelectric plant of 3000 hp. is to be equipped near Mountain Home, Ark., by E. N. Sanderson, 60 Broadway, New York, and others.

The Corinth Handle Co., Corinth, Miss., has been organized by W. A. Stewart and others and will equip a plant for the manufacture of wooden handles.

The Canton Oil Mill, Canton, Miss., has been burned with a loss on machinery of $80,000. It will be rebuilt.

The Mississippi Industrial Institute and College, H. L. Whitfield, president, Columbus, Miss., will equip a power plant to cost, with buildings, $175,000.

Blanchard, Okla., will equip an electric light and power plant.

Seminole, Okla., has appropriated $6,000 for the purchase of electric light plant equipment.

An appropriation of $20,000 has been made by Woodward, Okla., for electric light and power plant equipment.

The W. T. Adams Machine Co., Corinth, Miss., will rebuild its plant recently destroyed with a loss of $200,000.

The Wagner Electric Co., St. Louis, will erect a building 150 x 512 ft. for the manufacture of ammunition for the Government.

The International Cotton Picker Corporation, J. W. Dinsmore, president, 119½ Broadway, Oklahoma City, Okla., is in the market for about $25,000 worth of machinery to manufacture cotton pickers.

The Colonial Oil & Refining Co., Oklahoma City, Okla., organized with a capital of $1,000,000 by Lester B. Gum, Charles H. Taylor and Walter D. Caldwell, will equip an oil refinery.

The Grant Sprague Lumber Co., Oklahoma City, Okla., is in the market for about $50,000 of equipment.

The International Shipbuilding Co., Pascagoula, Miss., will install additional machinery to cost about $150,000.

The United States Government will equip water, electric light, power and sewage plants at the Naval Station, Barataria Bay, La.

The Benham Engineering Co., Oklahoma City, Okla., will install booster pumping equipment at Guthrie, Okla., G. C. Anderson is city clerk.

The Rex Stove Co., South Fort Smith, Ark., has been incorporated with a paid up capital of $100,000, and has taken over the foundry and other assets of the Fort Smith Stove Works and the Rex Mfg. Co., Muskogee, Okla. It will bring out a complete line of new patterns in conjunction with its present line. W. J. Henry, formerly secretary-treasurer of the Rex Mfg. Co., will be president and general manager.

Texas

AUSTIN, TEX., Jan. 26.

The G. B. R. Smith Milling Co., Sherman, has awarded contract to the Southwestern Engineering Co., Springfield, Mo., for a grain elevator of 300,000 bu. capacity to cost $100,000.

Citizens of Brownwood, under the direction of Peter Whaley, secretary of the local chamber of commerce, have formed a company to build a pipe line and install pumping plants.

The Texas Co., Houston, which recently increased its capital stock from $55,500,000 to $69,375,000, will enlarge its oil refining and marketing facilities.

The Golden Rod Mills, which has been incorporated at Fort Worth with a capital stock of $80,000, will construct cotton-seed oil mills, gins and compresses. J. R. Stitt, Fort Worth, is one of the promoters.

Dr. Nathan Boyd, Las Cruces, N. M., is at the head of a committee of the Rio Grande Water Users Association which is promoting the construction of a hydroelectric plant as a part of the Elephant Butte reclamation project.

The American Reinforced Concrete Tie Mfg. Co., Eagle Pass, will construct a plant there for the manufacture of reinforced concrete railroad ties. W. F. Faust is president.

California

SAN FRANCISCO, Jan. 28.

The Warman Steel Casting Co., Douglas Building, Los Angeles, maker of electric and crucible steel castings, has awarded a contract for the construction of a 100-ft. extension to double the capacity of its plant at Huntington Park.

The Master Foundry, Los Angeles, has filed notice of organization to operate a plant at 1008 Santee Street. Charles A. Webster, Graham Station, and J. C. Browell, 689 Arden Road, Pasadena, head the company.

The Peoples Ditch Co., Hanford, Cal., is planning to build a new electric light and power plant for local service.

The Perfection Auto Sheet Metal Works, Los Angeles, has

been organized to operate a plant at 1109 South Los Angeles Street. R. L. Dixon, 1166 East Forty-ninth Street, heads the company.

The Electric power plant, planing mill and boiler house of the Shasta Land & Timber Co., Redding, Cal., were recently destroyed by fire, with a loss of $50,000.

Francis Cuttle, Riverside, Cal., has filed plans for a one-story planing mill and wood-working plant, 115 x 190 ft., at the Central Industrial tract, near Los Angeles, to cost about $8,000.

The Main Street Iron Works, San Francisco, was established in 1869 and incorporated for $50,000 in 1905, not recently, as stated in THE IRON AGE of Jan. 10. At the present time it has under consideration the increasing of the capitalization to not less than $250,000 and possibly $500,000, due to the increased value of its plants. A third plant was recently acquired, on which it plans to spend several hundred thousand dollars in improvements. This plant will be immediately engaged in the manufacture of 40 marine boilers for the Shipping Board and the Emergency Fleet Corporation, also on considerable other work, both for Government and commercial interests. The buildings are of steel, 64 x 225 ft., to be equipped as a boiler shop; the machine shop, 84 x 225 ft., is now being equipped. This plant will be capable of building engines and boilers of any size. The buildings are so laid out that they can be extended several hundred feet. It plans also to erect a foundry, 95 ft. wide by several hundred feet in length, and a two-story office building and drafting room. The company has been engaged in the building of marine engines, boilers and all auxiliary machinery for the last 49 years. A. de Bretteville is vice-president.

The Pacific Northwest

SEATTLE, Jan. 23.

Construction work has been started on the shipbuilding plant of the Oceanic Shipbuilding Co. at Milwaukie, Ore., to cost $100,000. It will have capacity of 10 standard Government ships yearly.

The Modern Lumber & Mill Co., Tacoma, has been incorporated for $100,000, and plans the construction of a sawmill there.

The Mutual Novelty Mfg. Co., Tacoma, has been incorporated for $100,000 by R. O. Parent and F. M. Perrin. Plans for a plant are about completed.

The Elliott Bay Shipbuilding Co., Seattle, has completed plans for its four new ship sheds, 62 x 75 ft., to cost $25,000.

H. P. Scheel and William McArthur, Tenino, Wash., plan the erection of a coal-briquetting and by-products plant, with initial capacity of 160 tons daily, at Marshfield, Ore.

The C. P. Adams Lumber Co., Aberdeen, Wash., will erect two spruce mills in the Quinault Lake district, at a cost of $25,000. It has a contract to cut 6,000,000 ft. of spruce for the Government.

E. J. Adams, Eugene, Ore., is at the head of a syndicate that plans the construction of a shipbuilding plant at Florence, Ore. It will be equipped with four ways, and will have capacity of 10 ships of the Government Ferris type.

The Northport Mfg. Co., Northport, Wash., recently incorporated for $40,000, has commenced work on its proposed plant for the manufacture of patented articles. It is to be ready for operation within 90 days.

It is reported that the Norwegian vice-consul Belland at Seattle, with several other prominent Norwegians, plans the establishment of a shipbuilding yard and drydock in Seattle. A company is to be incorporated for $1,500,000,

The Seattle Mechanical & Electro Plating Co., Seattle, headed by A. W. Wells and J. D. Squires, plans the establishment of a small electroplating plant.

The Astoria Marine Iron Works, Astoria, Ore., has completed construction of its buildings, and machinery and equipment will be installed shortly. The company will specialize in ship materials. It holds a number of Government contracts.

The McLane Timber, Spar & Piling Co., Kelso, Wash., plans to increase the capacity of its sawmill plant to include the production of ship timbers and spars.

The Universal Nut Lock Company, Portland, has purchased a building in that city to house its new plant. Three 8-hour shifts are planned.

The Hallidie Company, Spokane, has secured contract for furnishing deck machinery and equipment for three shipbuilding plants, amounting to $125,000. It will enlarge its plant and install some additional equipment. The contract provides for anchors, windlasses, cargo winches, steam capstans and other deck machinery.

The board of public works, Seattle, will receive bids until March 1 for the construction of an addition to the municipal hydroelectric power station to cost $5,000,000. C. B. Bagley is secretary.

Construction will start immediately on the $1,500,000 steel shipbuilding plant to be erected in Vancouver, Wash., by the G. M. Standifer Construction Co. The taxpayers have passed a $125,000 bond issue to buy a site for the company. The Vancouver plant will also manufacture its own ship boilers and machinery.

The Aircraft Spruce & Lumber Co., Seattle, has been organized by lumbermen and bankers of the Grays Harbor country, to cut 10,000,000 ft. of spruce for aircraft construction. It plans to place a force of 5000 men in the woods. Alex Polson, Hoquiam, is president. The company has given the Government a $200,000 bond to assure fulfillment of its contract. It will construct a number of sawmills.

The Sidney Rubber Company, Vancouver, B. C., will erect a manufacturing plant near Vancouver, at an initial investment of $125,000.

Canada

TORONTO, Jan. 28.

The Page Wire Fence Co. of Canada, Ltd., Walkerville, Ont., has been incorporated with a capital stock of $250,000 by Arthur R. W. Plimsoll, Reigner Brodeur, Adolphe Chouinard and others of Montreal to manufacture iron, steel, metals, hot and cold ingots, billets, rods, bars, wire, cable, etc. It is making arrangements for the erection of a plant at Three Rivers, Que., to cost $150,000.

The Maple Leaf Harvest Tool Co., Tillsonburg, Ont., will build an addition to its plant to cost $35,000.

The Huntley Mfg. Co., Tillsonburg, Ont., will build an addition to its plant to cost $40,000.

The Turnbull Elevator Mfg. Co., 126 John Street, Toronto, will build an addition to its plant and install machinery at a cost of $40,000.

The Canadian Metals & Equipment Co., Ltd., 195 Alexander Street, Vancouver, B. C., will build a smelter and warehouse. T. H. Tracy, 744 Bute Street, is architect.

The Dominion Steel Products, Ltd., Morrell Street, Brantford, Ont., has awarded contracts covering the erection of an addition to cost $132,000.

The Giant Powder Co. of Canada, 602 Hastings Street West, Vancouver, B. C., has awarded the general contract to Wallace & McGougan, 1007 Burrard Street, Vancouver, for rebuilding its powder plant at Nanoose Bay, B. C., recently destroyed by fire.

The toolhouse, etc., owned by the Annapolis Shipping Co., Annapolis Royal, N. S., recently destroyed by fire with a loss of $35,000, will be rebuilt.

The engineroom of the Alberta Pacific Elevator Co., Nanton, Alberta, has been destroyed by fire with a loss of $40,000. M. J. Armstrong is manager.

The Engineering & Machine Works of Canada, Ltd., St. Catharines, Ont., has been incorporated with a capital stock of $1,000,000 by Harry R. Fraser, Frederick S. Rugg, Charles de la B. Mignault and others all of Sherbrooke, Que., to take over the Jenckes Machine Co., Ltd., plant at St. Catharines, Ont., to manufacture machinery, structural work, boilers, steel pipe, etc.

Green's Economiser, Ltd., Toronto, has been incorporated with a capital stock of $50,000 by William Gilchrist, Hamilton J. Stuart, Trades Bank Building, Toronto, and others, to manufacture machinery, etc.

The Comfort Mfg. Co., Ltd., Toronto, has been incorporated with a capital stock of $40,000 by Jim W. McFadden, Charles B. Nasmith, 2 Wellington Street East, and others, to manufacture bedsteads, etc.

Metals Chemical, Ltd., Welland, Ont., has been incorporated with a capital stock of $1,000,000 by Arthur W. Holmested, 20 King Street East; James L. Ross, Lancing B. Campbell and others, all of Toronto.

Auto Accessories, Ltd., Winnipeg, has been incorporated with a capital stock of $40,000 by L. S. Baxter, H. Rennie, W. F. Yeo and others to manufacture automobile parts, accessories, etc.

E. L. Cross, 553 Kelowna, B. C., is in the market for a 12 or 15-hp. gasoline or oil engine.

John Coughlan & Son, Vancouver, B. C., have purchased 425 ft. in addition to their present frontage on False Creek, on which they will build an addition to their shipbuilding plant in order to handle contracts for four additional steel freighters.

Hollis & Sons, Ltd., Hollis Street, Halifax, N. S., will rebuild its foundry, which was destroyed by fire. New machinery will be purchased. J. L. Kaye is secretary and treasurer.